The Iron Age

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York. Entered at the Post Office, New York, as Second-Class Matter.

Vol. XXXII: No. 3. *New York, Thursday, July 19, 1883.* *$4.50 a Year, Including Postage. Single Copies, Ten Cents.*

Loads and Strains on Hoisting Ropes.

The following interesting facts and suggestions relating to the above subject are communicated to the London *Engineer* by Mr. W. Silver Hall, of Derby, England:

Some years since, I had a winding rope broken about 3 feet above the cap, in the act of raising the loaded cage from the props; in fact, the cage was raised and fell about 2½ feet, as nearly as could be estimated. The weight of cage, tub, coal and chains, with the cap and piece of broken rope, would be 75 or 76 cwt.; the weight of rope suspended in the shaft, 32 cwt.; total, 108 cwt. The rope was a flat one, of iron wire, tapering from 4¾ to 4¼ inches wide, giving a breaking strain of 60 tons and 50 tons, and a safe working load of 136 and 112 cwt. at the upper and lower ends, respectively. It had only been in use a few weeks, and there was no sign of any flaw at the point of rupture. After the torn end was cut off and the rope recapped, it continued to do its work satisfactorily for the full average life of the ropes at that pit. The engine, although a single-cylinder one, was remarkably easy to handle, and the engine man one of the steadiest and most skillful that I have known. The rate of winding, though smart, was not excessive, the run of 202 yards being made in 30 seconds, and the three-decked cage changed in 30 seconds, or, allowing for occasional delays, say 55 runs per hour.

At first sight the rope might have been expected to break at the top end, where the actual weight to be lifted was nearly 80 per cent. of the theoretical safe working load, rather than at the bottom end, where the weight was only 68 per cent. of the theoretical safe load; but when it is remembered that the 32 cwt. of rope is already in rapid ascending motion before the "snatch" comes to start the 76 cwt. of cage, &c., into motion, it is apparent not only that the rope actually did break where the severest strain came upon it, but also that that strain is very much nearer to the actual breaking strain than is commonly supposed.

A mere record of facts such as the above is not of much value unless it leads to the suggestion of some improvement in the appliances, or in the method of using them, calculated to obviate similar accidents in the future. One such suggestion, and the most obvious, is the substitution of steel for iron ropes, giving, with a rope of the same weight, an increased strength of some 50 per cent.; but, of course, at a considerably increased cost. To employ a stronger, and, consequently, heavier, iron rope would have the effect of striking an up-hand blow with a heavier hammer than before. Again, it is doubtful whether, for pits of moderate depth, the advantages obtained by a tapered rope are not purchased too dearly by the weakness at the bottom end, where, as we have already seen, the greatest strain comes at the moment of starting. Now, where the suspended weight of rope is counterbalanced by a tail rope—which, as I pointed out at the Leeds meeting of the Institution of Mechanical Engineers, in August last, can probably be economically applied in cases where the depth does not exceed 500 yards or thereabouts—the weight on the rope is constant at any stage of the winding, and consequently, a parallel rope is the right thing.

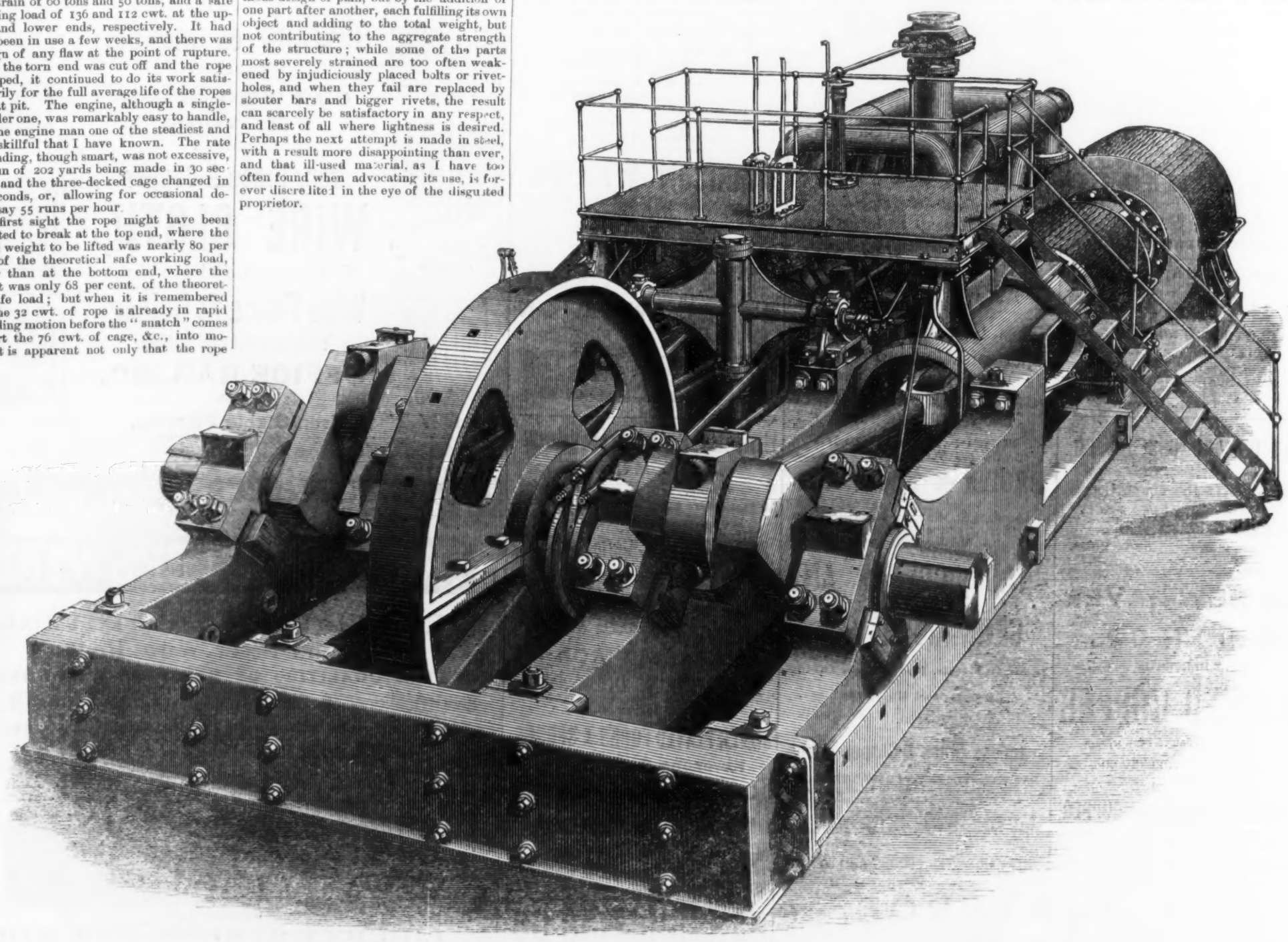
But perhaps the most important point of all is to diminish, as far as possible, the dead weight snatched at by the rapid starting of the engine, and this can only be done by using the lightest possible trams and cages. In the instance above given, if the cage had been of steel instead of iron, its weight might probably have been reduced 30 per cent. or more, and I could point out instances where a much greater reduction has actually been effected, thereby reducing the total weight to be snatched at—that is, coal, tubs, cage and chains—by about 12 per cent. But while cages are only too often considered as a convenient stock job, on which the colliery smith may advantageously employ the odds and ends of his time, and expend such bars of iron as he happens to have no other use for; while they are too often commenced, continued and finished without any harmonious design or plan, but by the addition of one part after another, each fulfilling its own object and adding to the total weight, but not contributing to the aggregate strength of the structure; while some of the parts most severely strained are too often weakened by injudiciously placed bolts or rivet-holes, and when they fail are replaced by stouter bars and bigger rivets, the result can scarcely be satisfactory in any respect, and least of all where lightness is desired. Perhaps the next attempt is made in steel, with a result more disappointing than ever, and that ill-used material, as I have too often found when advocating its use, is forever discredited in the eye of the disgusted proprietor.

As there is no difficulty in making a properly designed steel cage, which for any given weight of coal to be lifted shall be from 25 to 50 per cent. lighter, and shall cost no more than an iron one, it is surely time that the state of things which I have endeavored to describe, and which, as every mining inspector knows, is only too common, should cease to exist.

The Cutlery Exhibition in London.—The competition between artisans and apprentices for prizes given by the Cutler's Company of London has been highly successful, more than 150 competitors having entered the lists. Nearly all the prizes in the surgical instrument branches have been awarded to London men, while the prizes for general cutlery work are divided between London and Sheffield. The exhibition of the various articles of competition and other objects connected with the cutlery trade at Salters' Hall has created much interest, and has been visited by 11,000 persons. The exhibition closed on the 25th ult., when the money prizes and certificates were handed to the successful competitors by Miss Thorne, the daughter of the Master Cutler of London, the ceremony concluding by a vote of thanks to the company for their endeavors to create a healthy spirit of competition among the artisans and apprentices in the various branches, moved by Mr. Wood, an artisan in the surgical branch of the London trade, and seconded by Mr. Clarke, of Sheffield.

Reversing Rail-Mill Engines.

We present in the accompanying engraving, for which we are indebted to *Engineering*, of London, a perspective view of a large pair of horizontal compound reversing rail-mill engines recently turned out by an English firm. The engines in question have two high-pressure cylinders, each 34 inches in diameter, and two low-pressure cylinders, each 60 inches in diameter, all having 5-foot stroke. The cylinders are steam-jacketed, and provided with piston valves and link motions, the latter being worked by a hydraulic cylinder for reversing. The crank-shaft, which is of the marine type, is made in two pieces, bolted together, and weighs about 13 tons. The pins are 18 inches in diameter and 15 inches long, and there are four bearings, each 18 inches in diameter and 22 inches long. The connecting-rods are 13 feet 6 inches centers. The engines are constructed to work at a pressure of 90 pounds to 100 pounds per square inch, and deliver their exhaust steam to a surface condenser, fitted with brass tubes ¾ inch internal diameter. This condenser also serves to condense the steam of the accessory engines always to be found in a rail-making plant, and is provided with an independent pair of horizontal engines, with cylinders 16 inches in diameter by 30 inches stroke, which work two double-acting circulating pumps.



ENGLISH COMPOUND REVERSING RAIL-MILL ENGINES.

A New Wheel Tire.—A new wheel tire of novel design has been patented by Messrs. Merryweather & Sons, the fire-engine makers, of London. The object of this tire is to prevent the skidding of ordinary carriage wheels when traveling on roadways where street-car lines exist. The tire is notched on both edges, and as it overhangs the rim of the wheel, it effectively crosses and recrosses the rails without in the slightest degree twisting the axle. An experiment with a fire engine fitted with these improved tires was recently made in the Mile End Road, where the rails stand above the level of the roadway, owing to some temporary alterations, and the results were satisfactory. To those using vehicles of any description, especially mail carts or similar conveyances for quick transit, the improved tires will doubtless prove to be a considerable improvement upon the ordinary tires, both in saving of cost of repairs and an increased durability of the wheels.

Training of Railway Mechanics in Prussia.

On the 1st of July, 1882, there were 588 apprentices in 34 shops of the Prussian State railroads, 277 of whom were in shops expressly designed for the instruction of apprentices. These apprentices receive a special training for the purpose of securing thoroughly skilled mechanics for the Government shops; it is forbidden to use them as laborers, or in any one branch of their trade in which they may have acquired some facility; but they must receive instruction and be made skillful in all things which pertain to their trade, without regard to the profit which the shops can make out of them. The apprentices, as a rule, must not be less than 14 nor more than 16 years of age, and must have passed through the studies of an elementary school. The term of apprenticeship is four years. After appointment they are paid varying sums according to the place where employed, but never more than 20 cents per day at first, which is advanced every six months, according to the apprentice's ability, as shown by special tests, but never so as to equal the lowest rate of wages paid to regular employees in the trade. A tenth of these wages is withheld until the end of the apprenticeship. For the first two years the apprentices receive their training not in the great shops, but in small ones, which are fitted especially as training-shops, in which the apprentices are under direct supervision, and so far as possible are employed at work fitted for their capacity at the time. These shops are so equipped that all the work of the trade can be done in them.

The machine tools used are worked by hand or foot, to avoid accidents. Special effort is made in them to acquaint the apprentices with the different methods of treating different kinds of materials, the use of tools, &c., and they are taught to make and repair the simpler tools. These apprentice-shops are placed in charge of foremen of great skill and experience in their trades, distinguished for cultivation and solidity of character. After two years in these shops the apprentices are put in the ordinary shops and set at various kinds of work, and their adaptation for special kinds of work is noted. Besides this practical training, the apprentices receive instruction in schools on two week days and on Sunday of each week, in branches of knowledge calculated to help them to practice their trades independently, special regard being had to thoroughness in what is taught. In these schools the construction of machine-tools is explained and the properties of materials, and the apprentices are taught to make drawings of simple objects, parts of machines, &c., and to construct patterns after drawings and specifications of the materials required.

A Large Walking-Beam.—The beam of the new high-service engine of the St. Louis water works is 34 feet long, 7 feet deep in the center, is composed of wrought and cast iron, and weighs 68,000 pounds. The pump casting proper weighs 84,000 pounds, the cylinder and jacket weigh 28,000 pounds, the lower and upper head of the cylinder 16,000 pounds, the air chamber 66,000 pounds, the columns supporting the beam 56,000 pounds, the bed-plates 64,000 pounds, and the pump-plunger and bucket 20,000 pounds. The piston is 85½ inches and the piston-rod 8½ inches in diameter, with 10 feet stroke. The engine is to be run by six boilers 24 feet long, of the pattern known as the drop flue return boiler. A temporary frame building is being erected over the new engine. The foundations connected with the engine have been constructed to accommodate three more engines, and the plan is to place the engines in position before erecting the engine house. The foundation of the new boiler house is designed to accommodate 24 boilers, which will generate the steam to run the four new high-service engines.

The steam fire engines of the city of Berlin have pipes for the discharge of compressed carbonic acid into the steam chamber. When the engine starts from the station the boiler is heated; on arriving at the fire the carbonic acid is at first employed as a motor, then the gas and steam work together, and

ANSONIA
BRASS & COPPER CO.,
No. 19 Cliff Street,
Phelps Building, NEW YORK,
MANUFACTURERS OF
BRASS AND COPPER
IN
Sheets, Bolts, Rods, Wire, &c.
Seamless Brass & Copper Tubing.
Ansonia Corrugated Stove Platforms.
PURE COPPER WIRE
Electrical Purposes, Bare and Covered.
Phosphor Bronze Rods for Pumps, &c.
ANSONIA ★ REFINED INGOT COPPER.

PHELPS, DODGE & CO.,
IMPORTERS OF
TIN PLATE,
ROOFING PLATE,
Sheet Iron Copper, Pig Tin, Wire, Zinc, &c.
MANUFACTURERS OF
COPPER AND BRASS.
CLIFF STREET, NEW YORK.

SCOVILL MFG CO
BRASS,
HINGES WIRE, GERMAN SILVER.
PHOTOGRAPHIC GOODS.
BUTTONS,
CLOTH AND METAL.
DEPOTS, 419 & 421 Broome St., N. Y. 177 Devonshire St., Boston. 183 Lake St., Chicago.
FACTORIES, Waterbury, Conn. New Haven, Conn. New York City.

DICKERSON, VAN DUSEN & CO.,
Importers of
Tin Plate, Pig Tin, Sheet Iron, Copper, Wire, Zinc, Etc.
29 & 31 Cliff St., cor. Fulton,
DICKERSON & CO., Liverpool. NEW YORK.

THE NEW HAVEN COPPER CO.,
SOLE MAKERS OF
POLISHED COPPER
Under Patent of T. James, Sept. 12, 1876.
ALSO MANUFACTURERS AND DEALERS IN
BRAZIERS & SHEATHING COPPER,
Kettles, Bottoms, Bolts, Circles, &c.
290 Pearl Street - NEW YORK.

Waterbury Brass Co.
CAPITAL, $400,000.
Sheet, Roll and Platers' Brass,
GERMAN SILVER,
Copper, Brass and German Silver Wire,
BRASS AND COPPER TUBING,
COPPER RIVETS AND BURS,
BRASS KETTLES,
Door Rail, Brass Tags,
PERCUSSION CAPS,
POWDER FLASKS,
Metallic Eyelets, Shot Pouches, Tape Measures, &c.
And small Brass Wares of every Description. Cartridge Metal in Sheets or Shells a Specialty. Sole Agents for the
Capewell Mfg. Co.'s Line of Sporting Goods.
DEPOTS, 296 Broadway, New York, 125 Eddy St., Providence, R. I.
Mills At WATERBURY, Conn.

Detroit Copper & Brass Rolling Mills.
BRAZIERS' AND SHEATHING COPPER,
ROLLED, SHEET & PLATERS' BRASS
GERMAN OR NICKEL SILVER,
Copper Wire for Electrical and other purposes, Brass and German Silver Wire,
Copper Rivets and Burs,
COPPER BOTTOMS FOR TEA KETTLES AND BOILERS.
Cor. Larned & Fourth Sts., Detroit, Mich.

ROME IRON WORKS,
Manufacturers of
Brass, Gilding Metal, Copper and German Silver
(In Sheets, Rods, Tubing or Wire),
COPPER & BRASS RIVETS AND BURS.
Rome, New York.

BROWN & BROTHERS,
81 Chambers St., N. Y. Waterbury, Conn.
MANUFACTURERS OF
BRASS, COPPER AND GERMAN SILVER
In Sheets, Rolls, Rods, Wire, Tubing, Rivets, and Burs, Etc.
ALSO,
Seamless Brass & Copper Tubing.
PATENTED SEAMLESS BRASS AND COPPER HOUSE BOILERS, warranted to stand 200 lbs. pressure and guaranteed against vacuum.
PATENTED SPRING TEMPERED SHANK, SILVER-PLATED, FLAT TABLE WARE, in rich designs.
GERMAN SILVER SPOONS AND FORKS.

A. C. NORTHROP,
Waterbury, Conn.,
NUVELTIES IN BRASS AND OTHER METAL GOODS
FOR HARDWARE TRADE.
Wrought Iron and Brass Machine Screws; Turned, Hexagon, Round and Square Head Cap and Set Screws; Brass and Iron Safety and Jack Chain; Gilt, Nickel Plated and Bronze Trimmings of all kinds, from Sheet Iron, Steel or Brass.
Estimates on patented articles, or any description of Sheet Metal work, respectfully solicited and romptly given.

BRODERICK & BASCOM ROPE CO.,
MANUFACTURERS OF

IRON WIRE ROPE. STEEL WIRE ROPE.
728 N. Main St., St. Louis, Mo.

WORCESTER WIRE CO.,
Manufacturers of
IRON AND STEEL
WIRE
For all Purposes.
WORCESTER, MASS.

The Plume & Atwood Mfg. Company,
MANUFACTURERS OF
SHEET and ROLL BRASS and WIRE,
German Silver and Gilding Metal,
Copper Rivets and Burs,
Copper Electrical Wire, Pins,
Brass Butt Hinges.
Jack Chain,
Kerosene Burners,
Lamp Trimmings, &c.
18 Murray Street, New York.
13 Federal Street, Boston.
109 Lake Street, Chicago.
Rolling Mill, THOMASTON, Ct. | Factories, WATERBURY, Ct.

Bridgeport Brass Co.,
MANUFACTURERS OF
Sheet and Roll Brass,
Brass & Copper Wire & Tubing,
Seamless and Brazed Tubing,
Copper and Iron Rivets.
OILERS and CUSPADORES, LANTERNS and TRIMMINGS, Clocks & Fly Fan Movements, | LAMPS and TRIMMINGS, KEROSENE BURNERS, PLUMBERS' MATERIALS.
Particular attention paid to cutting out Blanks and manufacturing Metal Goods.
MANUFACTORY, *Bridgeport, Conn.* | WAREHOUSE, *19 Murray St., N. Y.*

HARRISON WIRE CO.,
ST. LOUIS, MO.,
MANUFACTURERS OF ALL KINDS OF
STEEL AND IRON
WIRE ROPE

Holmes, Booth & Haydens,
WATERBURY, CONN.
NEW YORK, 49 Chambers St. BOSTON, 18 Federal St.
Manufacturers of all kinds of
Brass, Copper & German Silver,
ROLLED AND IN SHEETS.
BRASS & COPPER WIRE,
Tubing, Copper Rivets & Burs.
BRASS & IRON
JACK CHAIN, DOOR RAIL.
German Silver Spoons,
SILVER PLATED FORKS & SPOONS,
Kerosene Burners, &c.

JOHN DAVOL & SONS,
Agents for
Brooklyn Brass & Copper Co.,
Dealers in
Ingot Copper, Spelter, Lead, Tin, Antimony, Solder & Old Metals.
100 John Street, New York.

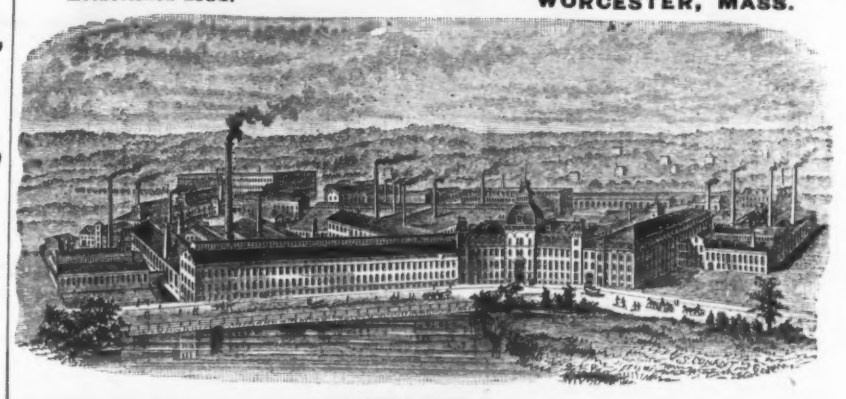
PASSAIC ZINC CO.
Manufacturers of
Pure Spelter
FOR
Cartridge Brass, Gas Fixtures, Bronzes
AND ALL FINE WORK.
Also for
Galvanizers & Brass Founders.
MANNING & SQUIER, Gen'l Agents,
113 Liberty Street, N. Y.

Geo. W. Prentiss & Co.,
HOLYOKE, MASS.,
MANUFACTURERS OF
IRON WIRE.

Bright, Coppered, Annealed and Tin Plated. Also GUN SCREW WIRE
Of all sizes straightened and cut to order.

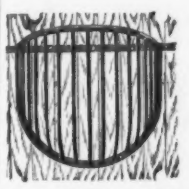
BROWNING, SISUM & CO., 85 Chambers St.
Manufacture
Belt Hooks, Cotters, Spring Keys, D Rings Staples, and everything pertaining to wire bending Factory BROOKLYN.

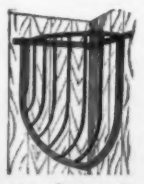
PHILIP L. MOEN, President and Treasurer. CHAS. F. WASHBURN, Vice President & Secretary.
WASHBURN & MOEN MANUFACTURING CO.
Established 1831. WORCESTER, MASS.



MANUFACTURERS OF
IRON and STEEL WIRE,
Patent Steel Barb Fencing, Patent Steel Wire Bale Ties.
WIRE RODS of all Grades; Round Iron, Rivet quality, 3-16 in. to ¾ in., cut to any length. Owners and exclusive Operators of the **PATENT CONTINUOUS ROLLING MILL,** producing Iron and Steel WIRE in coils of 100 pounds, without SEAM or WELD. **Patent Galvanized Telegraph Wire,** Market and Stone Wire, Annealed Fence and Grape Wire in long lengths; Coppered Pail-Bail Wire; Rope, Bridge, Bolt, Screw, Rivet, Buckle and Chain Wire. Wire for the manufacture of Card Clothing, Heddles, Reeds, &c. Piano-string Covering Wire. Tinned Broom Wire and Tinned-plated Wire of all sizes. A specialty is made of Clock, Machinery, Gun Screw and Spiral Spring Wire, and Refined Wire to Pattern for particular purposes, from selected stamps of Norway Iron. Any grade of Wire furnished, Annealed, Bright, Polished, Coppered, Galvanized or Tin Plated. Wire furnished Straightened and Cut to any length. **Steel Crinoline Wire,** Patent Linen finish. **Unrivaled Steel Music Wire.** Steel Wire for Springs, Needles and Drills. Market Steel Wire kept in stock, all sizes.
WAREHOUSES: New York, 16 Cliff, and 241 Pearl Sts. Chicago, 107 and 109 Lake St.


Crimped Wire Stall Partition.


No. 54. Double or Half Circle Wrought Iron Hay Rack.


No. 55. Corner Hay-Rack, Right Hand.

HOWARD & MORSE,
Warehouse:
45 Fulton Street,
NEW YORK,
Manufacturers of
Iron, Brass & Copper
WIRE CLOTH,
Plain and Ornamental Wire Work,
Wire Fence & Railing,
DOOR AND WINDOW GUARDS,
OFFICE RAILING,
ALSO,
Iron Stable Fixtures.


Church Guard. Round Iron Frames.

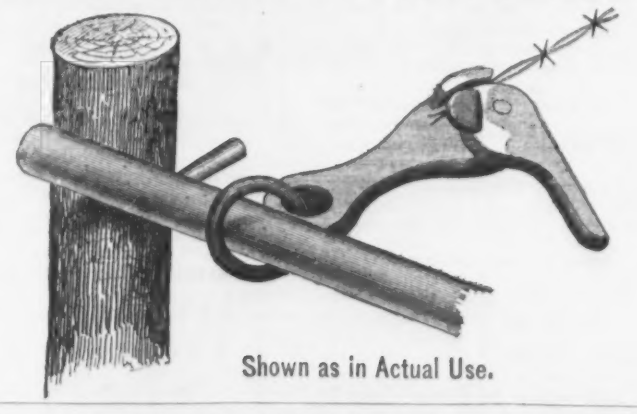

Window Guard. No.


Window Guard. No. 9.

ABRAM S. HEWITT, President
WM. HEWITT, Vice President.
JAMES HALL, Treasurer
E. HANSON, Secretary.
THE TRENTON IRON COMPANY,
(INCORPORATED 1847),
TRENTON, N. J., Manufacturers of
IRON and STEEL WIRE
OF ALL GRADES,
BRIGHT, ANNEALED, COPPERED, TINNED AND GALVANIZED
Iron and Steel Wire Rods;
EXTRA QUALITIES OF BAR IRON AND RODS.
Best Qualities of Gun-Screw and Charcoal Iron Wire: Crucible, Siemens-Martin and Bessemer Steel Wire.
Wire Straightened and Cut to Lengths.
New York Office, COOPER, HEWITT & CO., 17 Burling Slip.
Philadelphia Office, JOHN HEWITT, Agent, 21 North Fourth St.

WAREROOMS:
87 LIBERTY STREET, NEW YORK.
Works: WILKESBARRE, PA.

This Advertisement Changed Weekly.
IOWA BARB WIRE CO.,
87 Liberty St., NEW YORK 89 Lake St., CHICAGO.
STAUFFER, MACREADY & CO., New Orleans, La.
IOWA RING STRETCHER.


Shown as in Actual Use.

Tarred Lathyarn, Manila Rope.
A. LESCHEN & SON.
Manufacturers of
WIRE ROPE
Hemp Packing, Twines.
919 to 923 N. Main St., ST. LOUIS, MO.
Correspondence Invited

finally steam alone is used. By this arrangement the engine is brought into action four or five minutes sooner than would be otherwise possible.

The Value of Successive Additions to the Temperature of the Air Used in Smelting Iron.

Mr. I. Lowthian Bell, in a paper bearing the above title, and read at the spring meeting of the British Iron and Steel Institute, submitted the following, which, as it will be seen, has a bearing on the paper of Mr. W. Hawdon—"A Comparison of the Working of a Blast Furnace with Blast Varying in Temperature from 990° to 1414° F."—read at the same meeting and published in our issue of July 5:

The occasion which has led to the contribution of the paper by Mr. Hawdon is, in my opinion, very important, and in some respects the most satisfactory possible, when taken in connection with the subject of which it treats. Very often, when the value of air heated from 1200° to 1600° F. in fire-brick stoves has been compared with that of air heated to less elevated temperatures by the use of metal pipes, the comparison has been attempted on a mistaken basis. Old furnaces, with dilapidated hot-air apparatus, have been contrasted with renovated furnaces fitted with the most perfect means of heating the blast with which we are acquinted. In such cases a saving of 4 to 5 cwt. of coke per ton of iron was no doubt often effected, all of which has been sometimes placed to the credit of what may be conveniently distinguished as superheated air. To-day we enjoy the privilege of comparing the performance of the identical furnace, smelting the same kind of ironstone, with the same quality of coke, but by means of air at different temperatures, according as it was heated by the two kinds of stoves in question. Under ordinary circumstances I should have been content to take my share in the discussion on the paper when read; but it has fallen to my lot, here and elsewhere, to contest so many of the propositions advanced by authors of papers on fire-brick stoves that by some of my friends I am regarded as opposed to the principle involved in their use. When our president kindly offered me an opportunity of verifying the action of this particular furnace, before and after the change from metal to fire-brick stoves, he expressed himself in favor of the present occasion being used for considering generally the principles upon which the use of hot blast is dependent. Many of those whom I have the honor of addressing can only know from books the disbelief which greeted Neilson's discovery that 100 pounds of coal burnt in heating the blast was able to save 300 or 400 pounds of fuel burnt in the furnace. After this fact had been established beyond the power of contradiction, science attempted to explain the apparent anomaly. So far as I am aware, no explanation was considered satisfactory, which was probably due to the circumstance that few, if any, scientific men had sufficient opportunity for a lengthened study of the only really useful source of information, viz., the blast furnace itself. Every iron smelter of the present day knows—what, indeed, has been known for many years—that the office of the fuel on the blast furnace is of a dual character; besides fusing, it has to act chemically on the substances exposed to its influence. Full consideration, however, had perhaps not formerly been given to the amount of time required for both these operations, nor to the loss which might ensue from the period of exposure being insufficient in point of duration. Due allowance, however, must be made, in considering the want of success which attended these investigations of the earlier writers on the metallurgy of iron, for their less perfect knowledge of what was really required in the furnace itself.

In our time little in this respect is left to speculation, for, owing to the services rendered to our work by pure scientific inquiry, we in our day have gained a great advantage in being able to estimate the actual quantity of heat needed for smelting an ore of any given richness and composition In addition to this, we are able to calculate with considerable nicety the quantity of heat evolved by fuel of known quality. These two sets of factors, furnished by physical science, do not, however, supply the iron smelter with all the information necessary for a complete solution of the problems he has to deal with; but this want has, during the last few years, been supplied by gentlemen practically engaged in the management of blast furnaces. It will be most convenient to consider, in the first place, the source of the heat required for the fusion of the iron and slag in the hearth of the furnace. This heat is, of course, generated in all cases by the combustion before the blast of the solid carbon of the fuel, for, even if raw coal is used, all its volatile constituents are expelled before it reaches the vicinity of the tuyeres. There being two oxides of carbon, it is essential to remember that when this substance is burnt under the conditions which obtain in a blast furnace, it is the lower oxide alone (carbonic oxide, or CO) which is the ultimate product of the combustion in the hearth. This, from a heat-producing point of view, is a great loss, because one unit of carbon burnt to the higher oxide (carbonic acid, or CO_2) affords 3½ times as much heat as the same amount when only burnt to the state of the lower oxide. This impossibility of raising carbon to its highest state of oxidation arises from this substance in a solid condition, at high temperatures, being able to act on carbonic acid and reduce it to the lower oxide. And, besides this barrier to complete saturation of carbon with oxygen, there is another of still greater significance, viz., the power which heated iron also possesses to attack carbonic acid, and in like manner to reduce it to carbonic oxide, while itself becoming oxidized. If, then, there were any notable quantity of carbonic acid near the tuyeres of a blast furnace, the ore, or a portion of it, which has been reduced in the upper zone would be reoxidized in the hearth. So far as concerns any combustible substance likely, as a matter of cost, to be used in the blast furnace, we may, I think, accept as a condition precedent that it must be susceptible of two states of oxidation, to one of which it is raised at the tuyeres by means of the blast; while its conversion, or partial conversion, to the other state is caused by its action on the oxide of iron in the zone of reduction situate in the upper region of the furnace. Let us take the case of hydrogen gas, which, as a source of heat, offers the greatest inducement as a substitute for coke, inasmuch as it generates by its combustion more than 14 times as much heat as carbon does when burnt to carbonic oxide, and 4¼ times as much as carbon when burnt to carbonic acid. Oxidized hydrogen, however, or vapor of water, resembles carbonic acid in its behavior to iron; it would be formed at the tuyeres with the evolution of much heat, but all or a great part of this heat would subsequently disappear by its entire or partial reconversion into hydrogen, accompanied by a large amount of reoxidation of the iron. After what has been just said, it is needless to say that the admission of carbonic oxide at the tuyeres as a combustible would be attended with results similar in point of principle to those accompanying the use of hydrogen.

With these facts before us, it is clear that any attempt to use what is known as water-gas in the blast furnace can only end in disappointment. This substance is easily made, and, when pure, consists of equal volumes of carbonic oxide and hydrogen. It is usually procured by passing steam over highly-heated carbon. Notwithstanding the high calorific power of the hydrogen, it would under no circumstances present any advantage as a source of heat, because the same amount of heat as is evolved by burning this gas must, in the first place, be obtained by the combustion of a much larger weight of carbon, to which has to be added the unavoidable loss always attending similar processes. As already mentioned, the generation of carbonic acid in the blast furnace is due to the action of carbonic oxide on the ore, by means of which the reduction of the iron oxide is effected. A small amount of this acid is also produced by a peculiar change experienced by a portion of the carbonic oxide, in which carbon is at the same time precipitated. I have estimated that for each ton of pig iron made, carbon, in its highest state of oxidation, is generated by these two processes to a weight of 6.78 cwt., or thereabouts. The usual measurement of quantities of heat being the thermometric degrees by which one unit of water has its temperature raised, we will assume that to smelt 20 units of pig iron 90,000 Centigrade calories,* as the units in this form of measurement are designated, are required. Now, as one unit of carbon, burnt with air at 0° C. (32° F.) to carbonic acid gives off 8000 calories, we have $\frac{90,000}{8000} = 11.25$ units of carbon required for the generation of this quantity of heat. If to this we add carbon absorbed by the iron, say .60 unit, we have 11 85 units as the total carbon required, which represents, therefore, about 12 cwt. of coke per ton of iron. The quantity of heat just named—90,000 calories—suffices, it is true, for smelting such ironstone as that found in Cleveland; but we know quite well that fully 10 cwt. more than the weight of coke just named is consumed per ton of iron, even when burnt with air at 1000° F. Now, the reason why so much more coke is consumed than the 12 cwt. just spoken of is the existence of a limit beyond which the action of carbonic oxide, the reducing agent, is annihilated by the admixture of the resulting carbonic acid, which latter has an opposite tendency to that of carbonic oxide, being an oxidizing instead of being a reducing agent. Whatever the limit in question may be, it constitutes the first and most important impediment to lowering, beyond a certain point, the quantity of fuel employed for smelting iron. Having given to this supposed limit a great amount of attention, I hope that I may be permitted to lay before this meeting a very brief account of the conclusions I have formed on the subject. If we take 80 pounds of peroxide of iron, 56 pounds of this will consist of iron and 24 pounds of oxygen. Now we have only to conceive that the first half of this oxygen is held by the iron less firmly than the second half, in order to account for the limit referred to, as affecting the probable extent to which carbonic oxide can withdraw oxygen from oxide of iron.

Let us suppose that 4½ pounds of carbon could separate the first 12 pounds of oxygenn, but that the second 12 pounds of oxygen, being held to the iron by double the force which retained the first 12 pounds, the presence of twice as much carbon, or 9 pounds, will be required to tear the last 12 pounds away from the iron. This is not the precise way in which carbon actually deprives iron of oxygen in the blast furnace, but it constitutes an easy way of explaining the process of reduction. The result of the two operations will be to give us one part by weight of carbon in the form of carbonic acid, or one volume of the gas, accompanied by two parts by weight of carbon or carbonic oxide, or two volumes of the gas, the oxygen being equally divided between the two states of oxidation in which these two quantities of carbon are found.† Without insisting on the above view as really regulating the behavior of carbon with oxide of iron, I would simply remark that when the two gases, carbonic oxide and carbonic acid, approach the proportion just given as they leave the furnace, the mixture seems incapacitated from further action on iron ore. Further, a vast number of analyses, made under my own superintendence, and a still greater number by other authorities, have satisfied me on the extreme probability of this forming a condition of saturation of these gases with oxygen in coke furnaces which it is not likely will be exceeded. There are, no doubt, some cases mentioned, particularly in charcoal furnaces, where the proportion of carbonic acid exceeds the limit just laid down; but these, I think, are exceptional, and would require more time to explain than can be devoted to the subject at the presen moment. Adopting the figures just assumed

* Each Centigrade degree being equal to 1.8° F., the Centigrade scale gives much smaller numbers to deal with. This, and the facility afforded by decimal notation, is the cause of the Centigrade scale being adopted in my calculations.

† One equivalent of carbonic acid contains 6 of carbon and 16 of oxygen. Two equivalents of carbonic oxide contain 12 of carbon and 16 of oxygen.

the heat evolved by one unit of fuel will be $\frac{1 \times 8000 + 2 \times 2400}{3} = 4266$ calories; hence, to produce the 90,000 calories regarded as being required for 20 units of iron, we have $\frac{90,000}{4266}$, or 21.09 of pure carbon, say, 22.60 of coke. It should be mentioned, however, that the proportions of carbonic acid to carbonic oxide just named are, in point of fact, rarely reached, and that more generally the true heat equivalent of the carbon will be expressed by $\frac{1 \times 8000 + 2.2 \times 2400}{3.2} = 4150$ calories, in which case $\frac{90,000}{4150} = 21.68$ units of carbon, or 23.20 of coke. To this has to be added the carbon absorbed by the iron, making the total consumption a trifle under 24 cwt. to the ton of pig. This estimate is based on the supposition that the blast employed has a temperature of 0° C. (32° F.), but in the days of cold blast 40 cwt. of coke per ton of iron was considered a very moderate rate of consumption. This arose from two circumstances: First, the furnaces were so small—say 50 feet in hight, with a capacity of 6000 cubic feet—that the heated carbonic oxide and other gases reached the outlet before they had time to impart the necessary heat to the materials through which they had to pass; secondly, the ore had not time, for the same reason, to saturate the gases with oxygen; in other words, there was a deficiency of carbonic acid in the gases. I am unable, from actual experience, to lay down the dimensions a furnace ought to have had to secure such results in a cold-blast furnace as the 24 cwt. mentioned above; but I can refer to a step made more than half way, by pointing to furnaces built by Earl Granville. In this case the economy is obtained partly by the heat contained in the blast, partly by the fact that the gaseous matter, being much reduced in volume, passes more slowly through the materials, becomes more saturated with oxygen and has a better opportunity of heating the substances through which it passes on its way to the throat. It seems to me that if 15 or 20 years ago those who sought to explain the supposed mysterious action of the hot blast had been possessed of the information afforded by the performance of the last two mentioned sets of furnaces, much unnecessary speculatian would have been saved. Reference has just been made to circumstances which point to the similarity of effect produced by an enlargement of the furnace or by raising the temperature of the blast. I, unfortunately, do not possess all the needful data for estimating the value of the various factors required for an exact examination of a large furnace blown with cold air and a smaller one driven with hot air, but the sources of the saving are easily followed by an examination of the work of two furnaces, also of different dimensions, both blown with hot air of the same temperature, and both consuming 48.8 cwt. of calcined Cleveland stone per ton of iron.

	Fur'ce of 6000 ft.	Fur'ce of 11,500 ft.
Coke used per ton of pig	28.92 cwt.	22.32 cwt
Limestone "	16.00 "	13.66 "
Slag made "	32.20 "	30.40 "
Weight of blast "	128.12 "	103.74 "
Temperature of blast	485° C.	485° C.
Weight of gases pr. ton of pig	170.59 cwt.	138.66 cwt
Temperature of gases	452° C.	332° C.
ABSORPTION OF HEAT.		
Reduction of iron 18.6 × 1780 calories		33,108
Carbon impregnation .6 × 240 calories		1,440
Phosphorus, sulphur and silicon reduced		4,171
Fusion of pig iron 20 × 330 calories		6,600
Transmission through walls and tuyere water		5,476
Total		50,798
Evaporation of water in coke .74 × 540 calories		399
Expulsion of CO_2 from limestone 16.00 × 370 calories		5,920
Decomposition of CO_2 from limes one 1.92 C. × 3200		6,144
Decomposition of HO_2 in blast .11 H × 34,000		3,740
Fusion of slag 32.20 × 550		17,710
Carried off in gases, 170.59 cwt. × .24 sp. ht. × 452° C.		16,409
Total		101,120

As a result of all these changes we have in the smaller furnace 170.59 cwt. of gases per ton of iron, against 138.66 in the larger, the temperature of the former, from its lesser dimensions, being 120° C. (216° F.) higher than of the latter, and hence there is nearly double the loss of heat in the one case that there is in the others. The sum of these disadvantages is 12.71 per cent. against the furnace of 6000 cubic feet. We now come to consider the superior effect of the heat evolved in the larger furnace, and this is exhibited in the following estimates:

Fur. 6000 cub. ft.

Coke used per ton of iron	28.92 cwt.		
Less ash, &c.	2.56		
	26.36		
Carbon in limestone as CO_2 carrying off an equal weight of carb'n but producing no heat	1.92		
			Calories
Leaving C to burn to CO	24.44	× 2400	= 58,656
Of this C there is b'nt to CO_2	5.7	× 5600	= 30,632
Total			89,288

Fur 11,500 cub. ft.

Coke used per ton of iron	22.32 cwt.		
Less ash, &c.	1.92		
	20.40		
Carbon in limestone as CO_2 carrying off an equal weight of carb'n but producing no heat	1.64		
			Calories
Leaving C to burn to CO	18.76	× 2400	= 45,024
Of this C there is b'nt to CO_2	6.52	× 5600	= 36,512
Total			81,536

From these figures the heat equivalent of the fuel is thus obtained:

89,288 cals. / 28.92 coke = 3,087 cals.

Add to this the heat ascertained to have been contained in the blast: 14,724 cals. / 28.92 coke = 509 cals.

Giving a grand total of 3,596 cals.

81,536 cals. / 22.32 coke = 3,671 cals.

Add to this the heat ascertained to have been contained in the blast: 11,913 cals. / 22.32 coke = 534 cals.

Giving a grand total of 4,205* cals.

Now, the difference of heating effect for each unit of coke burnt is 16.93 per cent. in favor of the larger furnace, which, together with the 12.71 per cent., pretty nearly brings up the total saving to a trifle below 30 per cent., corresponding with the saving in coke, shown to be effected by the use of

* See note on page 7.

the larger furnace. Eighteen or twenty years ago it was first demonstrated that a considerable saving of fuel was effected by an enlargement of the blast furnace, and, about the same time, that the fire-brick stove was able to place at our disposal blast of a much higher temperature than that capable of being afforded by the use of metal pipes. Of the value of the higher temperature I was myself very sanguine, because, by means of very powerful metal stoves, we had at the Clarence Works for some time previously succeeded in raising the heat of the air to 1000° F., by which the consumption of coke had occasionally been reduced to 25 cwt. per ton of iron in furnaces of 6000 cubic feet capacity. I did not, however, expect to see much, if any, economy in coke result from adding greatly to the hight or dimensions of furnaces of, as already existing, viz., 80 feet high, with a capacity of, say, 15,500 cubic feet. This conclusion was arrived at by having ascertained that, whereas the gases from the furnace of 6000 cubic feet escaped with a reducing power of considerable activity, those from the larger furnace appeared unable further to deoxidize Cleveland calcined stone when exposed to their influence. There was, however, another possible source of loss, due to permitting the gases to leave the furnace before they had imparted all the heat they were capable of affording to the incoming solids. Repeated observations led me to infer that the average temperatures of the gases passing from furnaces of different dimensions at the Clarence Works were as follows:

Furnace.	A.	B.
Hight	48 feet.	80 feet.
Cubic capacity, cubic feet	6,000	11,500
Temperature of gases	845° F. (452° C.)	640° F. (337° C.)
Furnace.	C.	D.
Hight	80 feet.	80 feet.
Cubic capacity, cubic feet	15,500	25,500
Temperature of gases	585° F. (307° C.)	540° F. (282° C.)

In all these instances a certain amount of heat in the gases was derived from the ironstone being always charged warm from the kilns, and often at a temperature of 212° F. and more. The very small difference, viz., 45° F., or 25° C., between the heat of C and D, notwithstanding an increase of about 65 per cent. in the dimensions of the latter, led to the conclusion that practically we had all but arrived at the utmost useful limit of size of the furnace, at all events in smelting such stone as that of Cleveland. I was also induced to question, from actual observation, whether any advantage was being derived from heating the blast above 1000° F., when applied to furnaces of sufficient capacity. Theoretically, any saving from a higher temperature than 1000° F. at such furnaces must be, as I shall presently show, extremely insignificant, as compared with what was achieved at the first application of heated air by Neilson. These conclusions were warmly contested by many who had also paid great attention to the subject. From one quarter the possibility was intimated that Cleveland stone (calcined), having 40 per cent. of iron, might be smelted with 7.43 cwt. of coke, leaving the blast to supply the remainder of the heat. This theoretical weight was subsequently raised by its propounder to 13, and lastly to 17.25 cwt., at which figure it remains, I believe, in the minds of some. From another source we were assured that, by merely raising the temperature of the blast from 800° F. to 1150° F., 5 cwt. of coke per ton of iron had been saved in smelting Cleveland stone, and that an economy of no less than 7¼ cwt. had been effected by the substitution of fire-brick stoves for metal pipes to a furnace smelting hematite ore. Again, according to the views of a third authority, the saving was formulated into 1 cwt. of coke per ton of metal for every 200° F. communicated to the blast. These were the propositions which I have contested for the last 15 years—indeed, ever since the subject of fire-brick stoves has been the subject of discussion among iron manufacturers†. Let us now proceed to examine, chiefly by means of the laws which I have endeavored to explain, the cause of the immense saving effected by the first application of hot blast to the smelting of iron, and how it happens that this saving falls off so rapidly in furnaces of enlarged capacity driven with air heated to a temperature of 900° or 1000° F. A furnace receiving its blast at 32° F. will be assumed as consuming 45 cwt. of coke, and to fuse the ash of this coke and the earths in the ore, 25 cwt. of limestone are allowed. Owing to the immense volume of reducing gas arising from so large a consumption of coke, 5.91 units of carbon as carbonic acid per 20 units of iron will be considered as being present in the escaping gases. To ascertain the quantity of heat absorbed, precisely the same calculations are made use of as in the cases formerly referred to—the three sets being placed alongside each other for convenience of comparison:

	1. Furnace of 6,000 cubic feet. Cold-blast. Calories.	2. Furnace of 6,000 c. ft. Hot-blast. 485° C. Calories.	3. Furnace of 11,500 cubic feet 485° C. Calories.
Elements of absorption, *A*	50,798	50,798	50,798
Elements of absorption, *B*	44,716	33,913	30,955
Carried off in gases, *C*	28,304	16,409	8,860
Total	123,818	101,120	89,713

* The two sides of the account will not be found to agree precisely; thus, the heat produced by the combustion of the fuel amounts to:

	Furnace of 6,000 cubic feet.	Furnace of 11,500 cubic feet.
As given	89,288	81,536
Heat in the blast	14,724	11,919
	104,012	93,455
Whereas the elements of absorption amounted to	101,120	89,713
Difference	2,892	3,742

The differences—say, 2.8 and 4.2 per cent.—may arise from a variety of circumstances into which the limits of this paper will not permit us to enter.

† In the hope of avoiding the difficulty arising from an excess of carbonic acid in the gases, as pointed out by myself, it was proposed to deoxidize the ironstone before it was introduced into the furnace; but how and where could this take place? Heat and carbonic oxide are required for this operation, and where can these be got so economically as from the carbon which has served the purpose of fusion in the hearth, and which, if not employed for reduction in the furnace, would have to be less economically applied to the self-same purpose outside it.

The heat evolved is:

	Calories.	Calories.	Calories.
By combustion of fuel, assumed	123,818	86,396	77,794
Heat in blast	*nil.*	14,724	11,919
Total	123,818	101,120	89,713

We have then, as the number of calories per unit of coke consumed:

$$\frac{123,818}{45} = 2751 \qquad \frac{101,120}{28.92} = 3497$$

$$\frac{89,713}{22.32} = 4019.$$

From these factors we can deduce the quantity of coke represented by each of these elements of absorption as follows:

	No. 1. Cwt.	No. 2. Cwt.	No. 3. Cwt.
Under *A*	18.46	14.52	12.61
" *B*	16.25	9.69	7.47
" *C* (escaping gases)	10.29	4.71	2.24
Total	45.00	28.92	22.32

(To be continued.)

The Zinc Mines of Sussex County, N. J.

BY NELSON H. DARTON.

At Ogdensburg and Franklin Furnace, about 60 miles northwest of New York City, on the New York, Susquehanna and Western Railroad, are several veins of zinc minerals, which are, without question, the most interesting formations of their character in the United States. They have been worked for a number of years, but are as yet apparently inexhaustible. They were discovered by Dr. Fowler, a large property holder and mineralogist of the vicinity, in 1815–16, who drew attention to the wonderful variety and association of minerals in the outcrops of the veins, and also to the great purity and immense quantity of the ore in sight. It was not long before the attention of some capitalists was directed to the district, and they leased from Dr. Fowler the privilege of working certain of the mineral veins. Since that time these veins have been extensively developed, and have long formed a mining center at Franklin Furnace. Formerly, many men were employed in their development, but now a less number is required, as the mining facilities have been increased.

At Franklin, on Mine Hill, within 100 feet are the veins of magnetic iron ore, graphite, franklinite, 40 feet or more in thickness, and lying upon beds of pyroxene and garnet rock; and in the limestone, then the vein of zinc ore—besides which at Ogdensburg there are two other zinc ore veins, and thus there are three, which are included between walls of granular limestone, which a few feet beyond are adjacent to walls of gneiss, or in some instances syenite or granite. The localities are two in number: First, the two veins known as the West and Main veins at Ogdensburg, in Sparta township, and the vein two miles north at Mine Hill, in Franklin. The former veins are divided into three mines known as the Manganese, New Jersey and Passaic—the later mine being at present the only one worked. The Ogdensburg veins are very peculiarly arranged, and it is not until lately that their true configuration has become known, as pointed out by me in a paper read before the New York Academy of Sciences in November, 1882. On the geological map of the veins published with the survey report in 1868, they were mapped as being one, and that similar in arrangement to the vein at Mine Hill, with a crook toward the northwest, the latter having a crook to the northeast, both from the southern ends of the veins. The juncture of this crook was represented as a sharp point, and diverging at an angle of about 35° from the main vein. This is true at the Mine Hill vein, but at Ogdensburg the relations are quite different, as there are two distinct veins essentially parallel and several hundred feet apart at their southern terminations. But entirely separate from them are two high basins, 200 feet in diameter, and about 80 feet in depth. The main vein is 2000 feet in length, and 22 feet in thickness at the surface, and decreasing very gradually as it descends. It is surrounded by complete walls of dolomite, at least to a depth of 80 feet.

The ores that occur in it are the following: Zincite, a red oxide of zinc containing about 80 per cent. of zinc, the red color being caused by the presence of scales of red oxide of iron disseminated through it. This ore is a much valued one, and constitutes a large percentage of the average ore. It is used directly for the production of either spelter or white oxide of zinc. It is mixed in all proportions with the mineral franklinite in small black grains, or modified octahedrons containing iron, zinc and manganese. This mineral is separated from the zincite by mechanical or magnetic means, and used for the production of compounds of iron and manganese, known as spiegeleisen or ferromanganese. It was formerly rejected as worthless, not being of use in manufacturing zinc or iron, but is now a valuable production. Besides, there are several impurities: Rodonite or bisilicate of manganese, and tephroite, its unisilicate; rhodochrosite, its carbonate. Small amounts of silicate of zinc, willemite, also occur, besides carbonates of zinc and magnesia and very appreciable amounts of silicate of copper. The arrangement of these minerals in the vein is very peculiar, and I will detail them: The foot wall of dolomite, as before mentioned, is more or less impregnated, for about a foot in depth, with masses of zincite, holding a little franklinite and some tephroite, generally in large defined crystals. Above this is a bed of zincite, 6 feet in thickness, containing a small proportion of granules of franklinite, and, at times, considerable silicious matter. Above this is a hanging wall, not continuous, however, impregnated with rhodonite, franklinite, zincite, tephroite and rhodochrosite, and in a few places blende. Above this is the main vein, about 12 feet in thickness, of zincite, holding much franklinite and some small portion of the other minerals. Above this is a thickness of about 1 foot of a mixture of franklinite, zincite, rhodonite and rhodochrosite, quite separated from each other, and above this some pure zincite, which joins the veins to the hanging wall, which is also more or less permeated with the zincite.

The west vein is not of the even, regular dimension of the main vein, but of very crooked outline and variable widths and depths—from 16 feet to 4 in width, about 150

feet in length, and about 100 feet in depth. Nearly all the ore has been removed from it. Its character was similar to that of the main vein, but its constituents quite homogeneously mixed together. A tunnel connects this vein with the main one. The first basin is between the southern ends of the veins, the other just south of them; both were half filled with dirt when found, but under this was a thick bed of franklinite, and under this the calumine, a silicate of zinc, containing water. It was much mixed with dirt, but this is readily washed out, and is one of the most valuable outputs of the mines. When it is mixed with lime and distilled, white oxide of zinc is obtained. Its color proper is pure white, and many specimens in this condition have been found—one a cylinder 40 feet long, 2 to 4 inches in diameter, and with walls about 2 to 3 inches in thickness, of a pure white color, lying upon an incline up the basin, evidently at one time a water course. Many other specimens of various minerals have been found in this basin, especially some crystals of jeffersonite fully a foot long and perfect in every angle.

The Passaic Co., the only one at present at work, have developed mines for some time. The principal mine is in the main vein, from which 50 tons per day are taken, and the basin where the silicate or calamine is taken out. A large engine house is erected nearly over the mouth of the main vein, which has a shaft 240 feet in depth, and works two drills. Two 40-horse-power boilers are in the engine house, working an 8-inch mining pump with 5-foot stroke, an air compressor, a No. 5 Blake pump in the level, and a No. 1 Worthington double-action pump in the bottom of the shaft, besides some smaller machinery in the shop, the hoisting engine, &c.

At the calamine mine, a few hundred yards away, a small portable hoisting engine is used, and at the mills for washing it, at the bottom of the hill, a 6-horse-power Hoadley engine for running the stamps, washers, and a No. 3 Knowles pump, 10-inch cylinder, 16-inch stroke. The washed silicate is dried in heaps and shipped direct to their works, or, in some instances, sold to other companies. The able superintendent is Mr. T. M. Mitchell, who, assisted by about 60 men, attends entirely to the work, and it is since he has been with the company that the true width of the vein—22 feet—was ascertained. The vein of lean ore hiding the rich layer of zincite 6 feet in thickness was formerly considered the foot wall of the vein until explored by Mr. Mitchell.

At Mine Hill, in Franklin, the zinc is again found in nearly a direct line northwest; the Ogdensburg deposits in a vein of nearly the same length, but in many places 40 feet in thickness, of quite homogeneous composition, and apparently inexhaustible. It has been much mined, but now only one opening is worked to any extent, which is the Buckwheat Field mine on the crook of the vein. Here is a monstrous opening, several hundred feet in length, 40 in width and 70 in depth, approached by a tunnel from the valley of the Walkill River, a distance of 1000 feet, and by ladders up its side. There is a shaft about 100 feet deep in the opening and ramifying out into the vein. Opening from the north is a huge grotto where they are now taking out ore. The entrance to this part of the vein was barred by a huge dike, apparently the end of the vein, it being 45 feet in thickness, and at right angles to the vein. Behind it the continuation of the vein was found, the grotto having assumed large dimensions by the removal of the ore, which is composed of zincite, franklinite and willemite, or green anhydrous silicate of zinc, besides some minor constituents. When mixed with lime and distilled, the oxide of zinc, thus freed from its silica, distills also, and thus this otherwise useless product is valuable. The mining is very simple here; compressed-air drills are used; the ore blasted out with giant powder, placed on cars, and drawn by donkeys through the tunnel to a small platform, where it is weighed and dumped directly on the cars for shipment to the company's works at Newark or to Jersey City. An engine for hauling ore from the mine below the opening to the donkey cars and for compressing the air for the drills is the only machinery employed besides a small mine pump below the opening.

Clay Pipes.

Within two or three years, says the Cincinnati *Trade List*, two-thirds of the common clay pipes smoked in this country were brought from England and Scotland, but at present scarcely one-sixteenth of the demand is supplied from those sources. This change is due to a number of causes, one being that domestic-made pipes are preferred by old smokers, and another that the great influx of immigrants, who almost invariably smoke clay pipes, has kept up the demand. At all events, the business of manufacturing clay pipes in this country was never more flourishing than at the present time. There are quite a number of clay-pipe manufactories in different parts of the country, the largest being in Brooklyn, Detroit, Baltimore, Woodbridge, New York, Union Hill, Newark, Providence, Cleveland, Syracuse and Rouse's Point. Besides these, there are smaller concerns scattered over the country that supply the local demand and employ but few hands. There are three extensive factories in Montreal and Quebec, and all of the above turn out the common clay pipe, which retails for a cent.

The white clay from which these pipes are made is worth about $3.50 per ton, and the red clay, which is more rare, $5.50 per ton. The latter variety is obtained near New Brunswick and Woodbridge, N. J., and is found at a depth of 50 or 60 feet. It does not run in regular veins, but in lumps or pockets, surrounded with an inferior quality of clay, from which it must be carefully separated. The blue pipe clay turns white on burning, except one English variety, which becomes red. The white clay turns a slight yellowish tinge in baking, but the red retains its color. The imported English clay has, when finished, a finer natural gloss than the domestic article, beside being much tougher. English pipes are frequently made with stems 30 inches long, while 7 inches is the usual length of an American pipe. But domestic clay is far more porous, and consequently when manufactured into pipes is much better for smoking. The best pipe clay in the world is brought from Powhatan County, Va., though it is closely resembled by a variety found near Baltimore. From the places above named comes the bulk of the domestic pipe clay, though some small lots are found in Maryland. The Detroit and Canadian factories obtain their clay from the English markets, as it can be brought to them by the routes on the great lakes cheaper than the American product can be carried overland.

A skillful pipe molder earns from $8 to $16 per week, according to his ability and industry, but to receive the latter sum he must mold 256 pipes an hour and work 60 hours a week. When working by the piece, as is the usual custom, his wages are 20 cents a gross, but to allow for breakage and loss in baking, a molder's dozen is fixed at 16 instead of 12, and so to make a gross 192 pipes are required, instead of 144. The girls who polish and finish the pipes receive 5 cents per gross, and the manufacturer sells a three-gross box of complete pipes for $1 to $1.20, his gross consisting of 144. It will be seen that the profits of the business are large, as only simple machinery is required, the work all done by the piece, and the demand is generally good the year round.

Frictional Electricity in Mills.

A recent issue of the *Electrician* gives an interesting account of frictional electricity in mills, stating that one of the mills of the Evans Imitation Leather Co., at Salem, N. H., was set on fire in a very curious manner some months since. The goods of this company are a contradiction of the old college song, "There's nothing like leather," for it is cloth, covered with a preparation which resembles leather.

In the manufacture of this substance the cloth is carried between rollers beneath the coating mixture, and the surplus is removed with a long scraper. The compound is mixed with naphtha. A short time ago a man was reaching over the covering machine, when the frictional electricity generated at the rollers drew sparks from his fingers, which ignited the naphtha and destroyed the mill. In the other mills of this company, copper conductors leading to the earth were placed at every point where there was a liability of the production of frictional electricity, so that it is now impossible to obtain a spark by placing the knuckles at any belt.

The present process of calendering paper electrifies it, and the pile of sheets retain the static charge for a long time. Such paper cannot be printed with any facility, as every printer knows to his cost. In printing the calendered sheets of Gregory's seed catalogue, out of 90,000 sheets that were given to the printer 8100 were utterly ruined and many others were defective.

An example of the ability of highly-finished paper to retain a static charge can be seen by unfolding one of the semi-weekly issues of *Bradstreet's* upon a desk and rubbing it with dry hands briskly from the center to the edges; if the air is dry it will then retain its position upon a shellaced door for a long time.

F. W. Bacon, the veteran mechanical engineer, recently gave an account of some interesting experiments which he made with frictional elelectricity in the mills of the Bristol Mfg. Co., at Waltham, Mass, in 1839. He states:

"A belt about 14 inches wide, running some 1200 feet per minute, was run from an adjacent building into the weave shop, over the looms. It was soon seen that four pairs of looms over which the belts passed were seriously affected. The weavers declared that it destroyed their hair—that it made it 'stand on end;' if a thread broke, it sought at once the belt; that all the dust of the shop accumulated around them, to fall on the webs when the mill stopped. It was impossible to get weavers to run them. The overseer of the room applied to me to help him out of the trouble, having exhausted his own patience in attempting to remedy the evil. I took a ¾-inch bar of iron, of sufficient length to cover the width of the belt, drilled holes through it (No. 10 wire gauge) 1¼ inches apart, inserted pointed wires 2 inches long, fastened it up in the proper place, attached a No. 1 iron wire to the bar holding the points, carrying it off some 30 feet to the water-pipe. The remedy was complete; the hair fell, the broken threads also, and the dust stopped where it generated. I have used the same thing since with equal success.

The Hudson River Tunnel.—The work of pushing the tunnel under the Hudson River is progressing slowly, but steadily. On the New Jersey side the north tunnel has, up to the present time, been built out for a distance of 1600 feet, while the south tunnel is some 600 feet in length. The last section of the north tunnel on the New York side was finished about a month since, and work was immediately opened on the south shaft, opening it from the caisson. This is now in progress, and nothing is being done on the north tunnel or on the New Jersey side. Judging from present indications the promoters of the scheme seem to be fully confident of ultimate success, and though no definite time has been stated at the end of which the tunnel will be completed, there is reason to believe that the work will be finished at no very distant date.

The illuminations at Moscow during the coronation ceremonies were produced in the following manner: The Tower of Ivan the Great and its side galleries were lit up by 3500 small Edison lamps, fed by 18 portable engines, which moved a number of dynamo-electric machines of every existing system. The portable engines and machines were kept on the other bank of the Moskwa. The sheds communicated with the tower by 70 aerial electric wires. On the ramparts of the Kremlin toward the river 8 large and 10 smaller electric suns threw their light over the river. The rest of the illuminations consisted in 200,000 lamps and 30,000 colored-glass globes, 50,000 lanterns of Venetian glass, 600,000 tapers, and 10,800 pounds of fireworks.

Cutlery.

JOHN WILSON'S CELEBRATED

NO ARTICLE MARKED "WILSON" IS GENUINE. UNLESS IT ALSO BEARS THE

TRADE MARK

"FOUR PEPPERCORNS AND A DIAMOND"

GRANTED A.D. 1766 BY THE CORPORATION OF CUTLERS OF SHEFFIELD, AND PROTECTED BY ACT OF PARLIAMENT.

REGISTERED ALSO AT WASHINGTON, U.S. ACCORDING TO ACT OF CONGRESS.

ALSO AT LEIPZIG, IN ACCORDANCE WITH THE GERMAN TRADE MARKS' REGISTRATION ACT.

BUTCHERS' KNIVES,
BUTCHERS' STEELS,
AND
SHOE KNIVES.

INFRINGEMENT.—SPECIAL NOTICE.

It having come to the knowledge of JOHN WILSON that Counterfeit Butchers' Knives, purporting to be of his manufacture, are being sold in the United States, he hereby cautions all purchasers of his Knives and Steels to be on the alert against such impositions.

JOHN WILSON also hereby gives NOTICE that it is his determination to institute Legal Proceedings against any person or persons who may be detected infringing his Trade Mark, and with that view he will handsomely reward anyone supplying such evidence as will lead to the conviction of the Makers and Vendors of the said Spurious Imitations.

WORKS:—SYCAMORE ST., SHEFFIELD, ENGLAND. Established 1750.

Cutlery.

CORPORATE MARK.

Joseph Rodgers & Sons'

(LIMITED)

CELEBRATED CUTLERY,

No. 82 Chambers Street, New York.

F. & W. CLATWORTHY, Agents,

The demand for **Joseph Rodgers' & Sons'** productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam-power.

To distinguish Articles of **Joseph Rodgers & Sons'** Manufacture, please to see that they bear their Corporate Mark.

Cutlery.

Best Quality Japanned and Nickeled

SHEARS,

SCISSORS and PRUNERS.

Manufactured by

J. WISS & SONS,

26 Bank St., Newark, N. J.

FOR SALE BY ALL RELIABLE DEALERS.

Send for New Catalogue.

THREE PRIZE MEDALS.

PARIS, 1855.

PARIS, 1878.

MATTHIAS SPENCER & SONS,

Albion Steel Works, Sheffield,

MANUFACTURERS OF

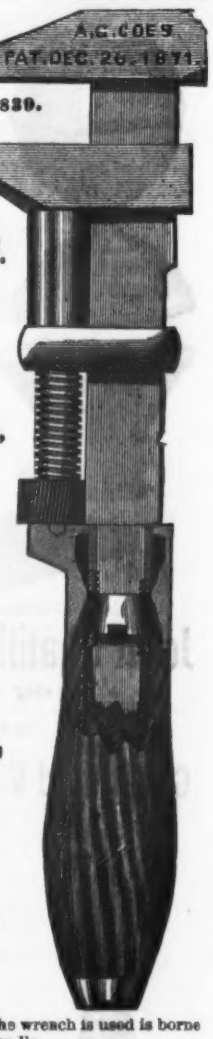
FILES
AND
STEEL,

Table Knives, Razors, Shovels, &c., &c., of every description.

CORPORATE MARK.

SPENCER SHEFFIELD

Granted 1749.



Established in 1839.

A. G. COES & CO.

WORCESTER,

MASS.

Successors to

L. & A. G. Coes,

Manufacturers of

THE GENUINE

COES
Screw
Wrenches.

PATENTED,

May 9, 1871.

December 26, 1871.

December 26, 1875

August 1. 1876

The backstrain when the wrench is used is borne by the bar—not by the handle.

The strongest Wrench made, and the only successful Re-enforced Bar.

None genuine unless stamped

A. G. COES & CO.

Our Agents, GRAHAM & HAINES, 113 Chamber St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

AMERICAN MADE RAZORS

J. R. TORREY,

MANUFACTURER OF

STROPS

In All Styles.

J. R. TORREY RAZOR CO.,

MANUFACTURERS OF

RAZORS.

To introduce we offer **HOLLOW GROUND RAZORS** at $1.50, $1.75, $2; Ivory, $2.50. Our **SWEDISH GEM RAZORS**, $1.75, $2, $2.50; Ivory, $3. All our own make, and warranted the best cutters in the world. As Razor makers we know what is needed to sharpen a dull razor, and will mail for 75 cents a Strop warranted to set a fine edge to any razor. If in morocco case, $1.

Factories at **Worcester, Mass.** Catalogues to the trade.

ESTABLISHED 1836.

ALFRED FIELD & CO.,

93 Chambers and 75 Reade Streets,

NEW YORK,

SOLE AGENTS FOR

Ely Bros., Caps, Wads, &c.,
Joseph Elliot & Sons, Razors,
Isaac Greaves, Sheep Shears, &c.,
Robert Sorby & Sons, Sheep Shears, &c.,
Edward Elwell, Hoes, &c.,
R. & J. Linacre, Grass Hooks and Sickles,
Webster & Horsfall Steel Wire,

GENERAL AGENTS

Western File Co.'s American Files.

HEADQUARTERS FOR

ANVILS CHAIN CUTLERY, GUNS, &c. &c. &c.

SPENCER & UNDERHILL,

94 Chambers Street, New York,

DEPOT FOR

G. F. WARNER & CO.'S CARRIAGE CLAMPS.

Also NICHOLSON FILE CO.'S FILES.

Russell Jennings' Augur Bits.
Richardson Bros.' Saws.
Germantown Tool Works' Warranted Hammers and Hatchets (Stamped Geo. Selsor & Co.)
Collier's Son's Awls.
American Screw Co.'s Wood, Machine and Rail Screws, Stove and Tire Bolts, Rivets, &c.

O. Ames & Son's Shovels, Spades and Scoops.
E. W. Gilmore & Co.'s Strap & T Hinges.
W. & S. Butcher's Chisels, Plane Irons, &c.
A. Field & Son's Tacks, Brads, Nails, &c.
Brade's Brick Trowels.

GENERAL HARDWARE.

A. F. BANNISTER & CO.

SUCCESSORS TO

FURNESS, BANNISTER & CO.,

MANUFACTURERS OF

TABLE CUTLERY,

Cor. Nassau & Sheffield Sts., NEWARK, N. J.

Engström's Celebrated Razors.

THE BEST IN THE WORLD.

For Sale by all Principal Dealers in Cutlery.

EVERY RAZOR IS FULLY WARRANTED BY

DAME, STODDARD & KENDALL,

SUCCESSORS TO

BRADFORD & ANTHONY,

SOLE AGENTS FOR THE UNITED STATES,

374 WASHINGTON STREET, - - - - - BOSTON, MASS.

Patented Articles of Malleable Iron.

Hammer's Malleable Iron Oilers.

Three Sizes. ***Nos. 1, 2 & 3.***

No. 1.

Hammer's Adjustable Clamps.
Hammer's Mall. Iron Hand Lamps.
Hammer's M. I. Hanging Lamps.

NEW pattern Heavy Screw Clamps; strongest in the market.

For sale by all the principal Hardware Dealers.

Send for Price List.

Malleable Iron Castings

of superior quality, and Hardware Specialties in Malleable Iron made to order.

HAMMER & CO.,

BRANFORD, CONN.

MANUFACTURERS OF

MACHINIST TOOLS, MILLING MACHINES,

Die Sinkers, Universal Heads, Index Centers, Universal Vises, Grinding Attachment for Lathes, Centering Machines. Gear Cutting and Milling Done.

Office and Works, No. 73 Scranton Ave.

W. R. EYNON & SONS,

CLEVELAND, OHIO.,

TREE AND HEDGE TRIMMER.

Unsurpassed for cheapness and durability. Unlike any other make, it combines a perfect lever principle with a blade working in a slotted steel hook.

Send for illustrated circular and price list.

E. S. LEE & CO.,

164 West Main Street,

ROCHESTER, N. Y.

GEO. H. CREED,

SHIP CHANDLERY,

103 Reade Street, New York.

Manufacturers of and Wholesale Dealers in

Cotton and "Long Flax" Sail Duck, Cotton and Linen Ravens,

Creed's Patent Ships' Clews. Heitman's Wire Rope Splicers. Agent for Raymond's American Crane Oil for lubricating Cylinders and Valves.

ONEIDA ALARM TILL.

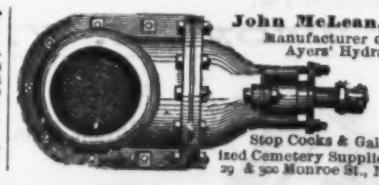
SUSCEPTIBLE OF OVER **100** CHANGES.

Better than any other Till in the market. No tampering with keys, as it alarms every time a key is touched, unless acquainted with combination. Send for prices and compare this Till with others in the market. No Till-tapping possible.

MANUFACTURED BY

THE ONEIDA ALARM TILL CO.,

EAST SYRACUSE, N. Y.



John McLean,
Manufacturer of
Ayers' Hydrants,

Stop Cocks & Galvanized Cemetery Supplies,
29 & 300 Monroe St., N. Y.

THE WIRE GOODS CO.,

Worcester, Mass.,

MANUFACTURERS OF

SHARP GIMLET POINTED

WIRE GOODS.

WIRE BENDING A SPECIALTY.

Wire Straightened and Cut to Length.

Office of

PHŒNIX CASTER CO.,

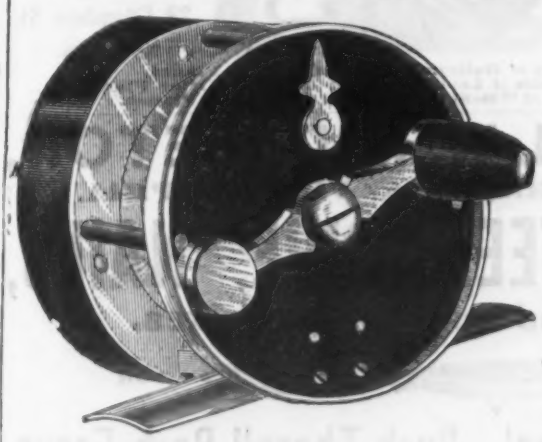
Indianapolis, Ind.

MARTIN'S CASTER

For heavy bedsteads, book-cases, flower stands, refrigerators, safes, sideboards, desks, or very heavy furniture. Also for heavy ice chests, magazine boxes, stove trucks, heavy showcases, beer boxes, or any very heavy weight. Especially adapted for use in beer bottling, fruit canning, tobacco or warehouse establishments, where heavily loaded tables need to be moved.

Send for Catalogue.

Our Drawer is so uniform, simple, strong and effective, that it has driven all competition from the field.



MALLESON'S
Patent Central Action
(DOUBLE)
Multiplying Reel

With Flush Handle and Adjustable Click.

For Sale by the Jobbing Trade Generally.

☞ Send for Catalogue and Price List of SPLIT BAMBOO, JOINTED BAMBOO and WOOD RODS; REELS ROD MOUNTINGS, &c., &

FREDERICK MALLESON,
Manufacturer,
126, 138, 140, 142, 144 First St.,
Brooklyn, E. D., N. Y.

No. 182. Oblong Plate.

PATENT
Anti-Friction
CASTERS.

MADE IN SIXTY STYLES,

from fine Brass Furniture Casters to Heavy Truck Casters weighing 70 lbs. per set. These goods have proved their practical merits for **Furniture, 8000** sets being used last year by makers of Folding Beds alone.

Send for new catalogue.

PAYSON MFG. CO., Chicago.

H. J. BRAINERD, Agent, 110 Pearl Street, New York.
NASHUA LOCK CO. Agents, Boston, Mass.

RIFLE MANUFACTURERS.

Dealers' Firm Names put on when desired.

GUNS
AND
PISTOLS.

WHOLESALE ONLY.

American and English Goods. Fishing Tackle, Winchester and Other American Rifles.

Manufacturers of Leather Gun Cases, Holsters, Bags and Clothing of Leather and Duck.

Dealers who visit us will always find **Job Lots.**

166 Main St., CINCINNATI.

B. KITTREDGE & CO.

BARNES' SAWS.

Complete Outfits for Workshop Business. **Lathes for Wood or Metal, at**

CHARLES E. LITTLE'S,

(Eastern Agency. Factory Prices.)

59 FULTON ST., NEW YORK.

Descriptive Catalogue Free.

The National Exposition of Railway Appliances.

(Third Notice.)

An oliver is a tool not much known in the Eastern part of the country, and yet one which the older workmen were in the habit of using to good advantage. A. Standish, of the Capital Machine Works, Columbus, Ohio, had a hammer of this kind on exhibition which possessed many advantages over the older style and will prove for many purposes a very desirable tool. It had an iron stand and a frame with buffers above to take the rebound, and steel springs below to raise the hammer head. It was worked by foot through a rock shaft and arm, and has a very wide range of usefulness. It was especially designed for making light forgings in dies cut to the shape of the work, for welding that is difficult to perform by hand, such as carriages, dash corners, cross-bars, &c., and for work that does not require a helper to handle the work, a smith, it is said, will do more and better work than smith and helper can do without it.

Link belts in all their various adaptations have worked a great revolution in certain classes of machinery, and have made a great many things possible which before were impracticable or exceedingly inconvenient. In harvesting machines, for example, the substitution of flat chains or belts instead of leather has given the machine a power and convenience that were unknown when the old-fashioned leather belt was necessary for driving the different parts of the mechanism. One of the curious outgrowths of these flat belts was shown at the Chicago Exposition. It was an endless freight conveyor, depending, of course only incidentally, upon the use of an endless flat chain, but nevertheless calling up the decided advantages of such belts. This endless freight conveyor has several forms. One of them is that of a constantly moving platform upon which the articles to be conveyed are laid, and which carries them along and discharges them upon a floor or platform at any convenient position. Another form was used for carrying boxes or cans from one floor to another. A V-shaped trough was laid between the two points, in the bottom of which a chain ran, carrying at short intervals teeth or sprockets. All that was necessary to do was to drop a box or can into the trough, when it would be at once caught by a tooth and conveyed to the distant point, when an attendant removed it. In this way transportation was made as rapid as the goods could be handled. The machinery was exhibited by the Link Belt Machinery Co., Chicago.

Lyman & L. La Rue Smith, 574 Carroll avenue, Chicago, exhibited a system for moving grain, seeds, meal, sand, sugar, coal, sawdust, tanbark, or, in fact, any similar substance, which was certainly among the simplest and most effective which we have ever examined. The motive power was a blast of air. In some cases it was obtained by forcing air into a reservoir containing the grain, and in other cases by exhausting the air from a reservoir into which it was desired to have the grain flow. When this was done a tube leading, say, from a grain elevator to a freight car, sucked up the grain with a speed which was certainly astonishing, considering the small sizes of the apparatus which were shown. We have no particulars in regard to the apparatus, but we should suppose that it would be easy to unload half a dozen cars at the same time without dust, and much more quickly than any ordinary system would be able to do it. The tube entering the car is made flexible, so that it can be directed into any portion of it, and the grain be sucked up from the corners as well as the center. It is a curious fact, not generally known, that a blast of air or steam passing rapidly through a pipe will convey very heavy substances, even through an exceedingly crooked pipe. We have known peat to be carried several hundred feet through what would be equivalent to a steam-heating coil pipe, only of somewhat larger diameter. All the turns were made and the discharge was as free, apparently, as though a simple straight tube had been used. This did not require a very powerful blast, nor apparently a high speed.

The Exhaust Ventilator Co., 111 Monroe street, Chicago, had an exhibit of their exhaust ventilator fans or exhaust-wheels. The power of these wheels is quite astonishing, and their cheapness makes them available in many places where other forms of ventilating wheels cannot conveniently be used, either on account of the size or the power required to drive them. The wheels run at a comparatively slow rate of speed, but the amount of air they are capable of handling is dependent rather upon the pitch of the veins than on the speed of the wheel. Many of our readers are familiar with the construction. The wheel is practically a screw propeller, so arranged, however, that centrifugal force is eliminated as a factor in the operation of the fans.

The Suspension Car Truck Mfg. Co., Mills Building, New York, had an exhibit which thoughtful railroad men examined with much care and interest. Almost every recognized principle in building the ordinary truck is in this truck ignored, and a construction employed which is decidedly at variance with many of the previously conceived ideas of railway men. The journals—or, rather, each axle—have a longitudinal motion across the truck, and what may be called the equivalent of the swing-beam of the truck has no side motion whatever, but carries upon a rocker arm the car bolster. This gives a double swinging motion, so that one side of the truck can move ahead or lag behind the other to a certain extent with perfect freedom, and the axles can swing backward and forward without disturbing the movement of the truck. A criticism on so wide but carefully studied departure from ordinary methods as this will be out of order until experience can demonstrate the value of the principles.

Mr. W. H. D. Newth, 103 Adams street, Chicago, had on exhibition a dumping ash pan which, by pulling a lever in the cab, dumped the ashes from the whole pan upon the track. There was no crawling under the engine nor raking them out. The whole was done instantly and at any desired point, either along the line or over a special dump. We did not see this at work, but we did see a very curious dump wagon on a similar principle drop its load in the most extraordinarily quick and satisfactory manner. The bottom of the wagon and the bottom of the ash-pan were formed of a series of leaves which, when the lever was tripped, hung downward, leaving the bottom open except for their edges. In the wagon they were restored to position by pulling each one up into position with a hook and stepping on it. The ash-pan was made so that it was only necessary to return the lever to its original place, when the bottom would then shut. The wagon, we believe, was manufactured by the Illinois Wagon Co., 162 Washington street, Chicago, and was the invention of Mr. Dougine, the vice-president of the company.

The Shay locomotive, manufactured by E. Shay, Haring, Mich., was one of the most extraordinary exhibits shown. A locomotive boiler and an ordinary tender tank are carried on one frame, and have trucks beneath the boiler and under the tank. The fire-box comes between the trucks, which are four or six wheel, as the case may be. The motive power is a vertical engine which drives a shaft running the whole length of the engine. This shaft has ball and socket joints and thimbles, so that it can bend vertically or horizontally, and lengthen or shorten, as may be necessary. Each axle has a bevel gear which meshes into a similar wheel on the driving shaft. This makes every wheel a driver, and gives the greatest possible amount of adhesion to the rail with a minimum weight upon any wheel. The engines are flexible, to a degree which is almost beyond belief, in both vertical and horizontal directions. We have forgotten now just how short a curve they can pass, but on the logging roads where they are used the curves are made of whatever radius happens to be convenient. They are run from 8 to 15 miles an hour, and will haul loads which really seem tremendous when their comparatively light weight is taken into account. They are used on steep grades, and the smaller sizes up to a weight of 8 tons can be used on any good wooden track. We have particulars in regard to the grades which some of them can overcome, and it is astonishing to see what they are capable of doing. These roads are built at an estimated cost of $2700 a mile for the lightest iron track that is recommended. Many of the larger lumbering companies, however, are using steel rails instead of iron, and consider them the most economical.

Snow plows, like car couplers, were well represented at the exposition. One regulation plow, well built, well designed and full size, was shown, but there were several devices, one of them full size, which it struck us would operate far better on exhibition or in a light fall of snow than in attacking a cut that had been drifted full of snow sufficiently solid to lift an engine off from the rails or wreck it if a fair plunge was made. One little arrangement which attracted slight attention from the casual visitor and which was a good deal laughed at by some who looked at it, exhibited by Lyman Morgan, Port Washington, Wis., struck us as having the germ of a good thing. Two vertical wheels set in the faces of a very sharp plow were fitted with shallow knives to cut and distribute the snow. These were driven by a stationary engine on a car in the rear. The short point of the plow projecting beyond these wheels was sufficiently sharp so that it could be thrust into a bank far enough to allow the wheels to begin their work. If stoutly constructed and driven with power, they were so arranged that they could do their duty even against a bank of ice. Modifications may be found necessary, but certainly the invention contained the germ of a good idea and was a step in the right direction. A great many of the snow-plow exhibits were evidently designed by men who had never seen a bank of snow packed hard enough to carry a railway train and to make it difficult to get even a narrow edge spade in without striking a blow.

No description of the exposition would be complete without some mention of the car couplers, which, for very good reasons, had the gallery largely to themselves. We do not remember now the number of couplers which were exhibited, but it is safe to say there were quite as many as were ever seen before in any one place except the Master Car Builders' rooms in Liberty street. These exhibits were the most pathetic of any in the whole show. The idea that a car coupler is needed has taken possession of thousands of men all over the country who have a taste for mechanics. Generally without much knowledge of railroading, they attempt an invention which by its difficulty has staggered the best inventive talent in the country, and the result is that we have on our Patent Office records something over three thousand inventions, probably 99 per cent. of which are useless and will only be a source of expense to the inventor. Here and there one may be seen which has a little merit, but the majority of them are hopelessly bad, and few men have the heart to tell one of these inventors how utterly useless all their labor and expenditure of time and money have been. Little that was new in this line, and at the same time likely to be useful, was shown. Few railway men are willing to say that the coupler of the future is yet invented. How these couplers are looked upon can best be guessed by the sign which was placed over an exhibit in the "Annex," reading to this effect: "This is not a car coupler, but a trolley for rolling mills and other places where it is necessary to handle heavy weights."

Fraser & Chalmers, Chicago, Ill., had on exhibition the "Comet" rock and ore crusher, which was doing exceedingly good work, and differs in its principles from almost anything which we have previously seen exhibited. It is a very compact machine, and the strains are taken through comparatively short distances and received very directly in the circular framing. It consists essentially of a hollow cone in which a solid cone is placed upon a spindle projecting downward for some distance. The cones do not fit each other, their points lying in opposite directions. The bottom of the long spindle is carried in a short circle by means of an eccentric. This, of course, vibrates the solid cone, and the rock which is thrown into the annular space between

H. D. SMITH & CO.,

Plantsville, Conn.,

Manufacturers of the

BEST QUALITY CARRIAGE MAKERS' HARDWARE,

Manufacture the Largest Variety of Forge Carriage Irons, of Best Material and Workmanship.

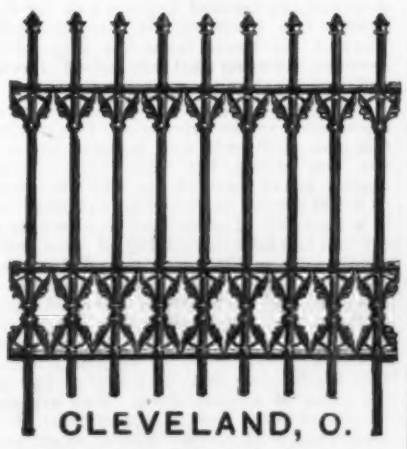
PRICES LOW FOR QUALITY OF WORK FURNISHED.

SEND FOR PRICE LIST.

VAN DORN IRON WORKS,

SOLE MANUFACTURERS OF THE

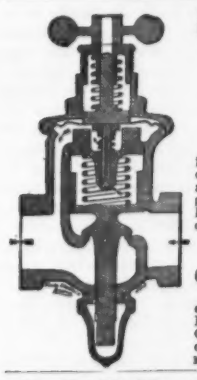
Cleveland Wrought Iron Fence,



CLEVELAND, O.

The best and cheapest Fence manufactured. Over 1,000,000 feet now in use. Send for catalogue and estimates.

(Please mention this paper.)



CURTIS PRESSURE REGULATOR,

FOR

STEAM and WATER,

is made entirely of metal; occupies the same space as a globe valve. It has no glands or packing, and is a lock-up valve. Write for circular. Manufactured by

Curtis Regulator Co.,

61 Beverly St., Boston, Mass.

General Agencies: 109 Liberty St., N. Y.; 926 Market St., Phila., Pa.; 80 Market St., Chicago, Ill., and cor. Halliday and Saratoga Sts., Baltimore, Md.

COBB & DREW

Plymouth, Mass.,

Manufacturers of Copper, Brass and Iron Rivets; Common and Swedes Iron, Leathered, Carpet, Lace and Gimp Tacks; Finishing, Hungarian, Trunk, Clout and Cigar Box Nails, &c. Rivets made to order.

NEW YORK AGENCY,

GRUNDY & DISOSWAY,

HARDWARE,

165 GREENWICH STREET,

Agents for the Philadelphia Star Carriage and Tire Bolts.

ROMER & CO. Manufacturers of Patent Jail Padlocks, Brass and Iron Padlocks, Carriage Lamps and Lanterns, 28 to 42 Summer Avenue, Newark, N. J. Illustrated catalogues sent to the trade on application.

HOW TO KEEP **BOILERS** CLEAN

FREE Book Sent To Any Address

By Jas. F. Hotchkiss. 84 John St. N.Y.

MINERS' CANDLES.

Superior to any other Light for Mining Purposes. Manufactured by

JAMES BOYD'S SON,

Nos. 10 & 12 Franklin St., New Y

SARANAC HORSE NAIL CO.,

PLATTSBURGH, N. Y.

A. WILLIAMS, Pres't and Treas. S. F. VILAS, Vice-Prest. W. S. GUIBORD, Sec'y.

The cuts illustrating this advertisement are of Nails twisted and bent when cold, and are manufactured from best brands Swedish Iron.

FOR SALE WITH

Sligo Iron Stone Co., Simmons Hardware Co., Careth & Byrnes Hardware Co., St. Louis Hardware Co. and Witte Hardware Co., of St. Louis.

Ely & Williams, Philadelphia and New York.

S. H. & E. Y. Moore, Hibbard, Spencer, Bartlett & Co., Edwin Hunt's Sons, Chicago.

S. G. B. Cook & Co., Baltimore.

Eureka Patent Shear

For Cutting Round and Flat Bar Iron and Sheet Metal.

MADE ENTIRELY OF CAST STEEL.

Cheapest and best tool for the purpose ever put on the market.

Send for Descriptive Circular.

EUREKA SHEAR CO.,

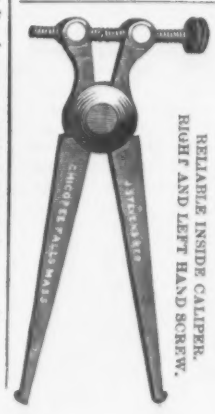
811 Market St., Philadelphia, Pa.

THE LEFFEL IMPROVED DOUBLE TURBINE MINING WATER-WHEEL,

Designed for mining purposes and the utilization of water power with limited quantity of water and high heads. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts. For further information and free illustrated catalogue, address

JAMES LEFFEL & CO.

Springfield, Ohio, or 110 Liberty St., N. Y.



J. STEVENS & CO.,

Chicopee Falls, Mass. P. O. Box 224.

MANUFACTURERS OF

Spring Calipers & Dividers.

Also Surface Gauges and Counter Sinks. Stevens' Patent Breech-Loading Sporting Rifles, double and single barrel; Shot Guns, Pocket Rifles, Pocket Pistols, and the noted Hunter's Pet Rifles. Our

SHOOTING GALLERY RIFLE

Is the favorite everywhere.

Send for Illustrated Catalogue and Discount.

NEW HAVEN HORSE NAIL CO

We Guarantee all Nails Superior in Quality.

TRADE NH MARK

Perfect in Driving Unexcelled in Finish.

FORGED POINTED FINISHED

FOR SALE BY

ELY & WILLIAMS, 178½ Water Street, New York.

RUNYON & HALLETT, 103 Chambers St., New York.

PATENT AUTOMATIC STOP

ELEVATORS AND DUMB WAITERS,

HYDRAULIC OR STEAM POWER.

SPEED, 50 TO 500 FEET PER MINUTE, WITH PERFECT SAFETY.

The fastest Belt Machine in the Market running noiselessly. Can be **stopped at any floor with certainty without an attendant.** Especially adapted to **high speed** Freight and Package business. Address

TEWKSBURY AUTOMATIC ELEVATOR CO.,

OFFICE AND FACTORY,

275, 277 & 279 Passaic St., NEWARK, N. J.

PAWTUCKET MFG. CO.,

PAWTUCKET, R. I.,

MANUFACTURERS OF

ALL KINDS OF BOLTS

For **Cotton, Woolen, Silk** and other **Textile Machinery** such as **Loom Bolts, Frame or Joint Bolts;** also **Boiler Bolts** with **Pilot Points, Boiler Patch Bolts, Round Heads, Square Heads, Hexagon Heads, Countersunk Heads,** both **Square and Round, Elevator Bolts** for fastening **Metal Buckets to Leather or Rubber Belts. Deck Bolts, Car Seat Bolts,** with **Slotted Heads. Bolts with Extra Large Heads,** for **Soft Wood, Leather,** or other **yielding material,** a specialty.

☞ **Send for Samples.**

All kinds of Cold Punching at Short Notice

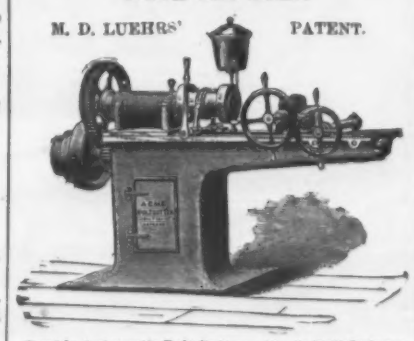
Elevator Bolts of All Kinds.

Samples Cheerfully Furnished.

"ACME" BOLT CUTTERS

WITH CAP DIES.

M. D. LUEHRS' PATENT.



Double Automatic Bolt Cutters. Single Bolt Cutters, ¼ in. to 4 in. Rapid Bolt Cutters. Nut Tappers, ¼ in. to 1¼ in. Rapid Nut Tappers, 3, 4 and 6 Spindles. Bolt Headers, four different styles. Bolt Pointers. Nut Presses, &c.

NOVELTY IRON WORKS

CLEVELAND, OHIO.

GEO. N. PIERCE & CO.,

BUFFALO, N. Y.,

New York Office, - 195 Water Street.

MANUFACTURERS OF

BIRD CAGES and REFRIGERATORS.

Send for Illustrated Catalogue and Price Lists.

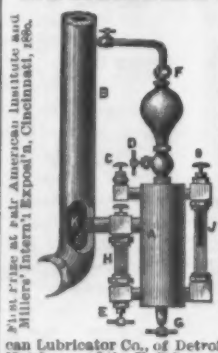
ALSO FOR SALE BY

Chicago Stamping Co., Chicago, Ill.
Sickles, Preston & Co., Davenport, Iowa.
Cincinnati Tin and Japan Co., Cincinnati, Ohio.
Kennedy, Spaulding & Co., Syracuse, N. Y.
Weaver & Goss, Rochester, N. Y.
E. A. Burrows & Co., Troy, N. Y.

THE DETROIT LUBRICATOR CO.'S

SIGHT-FEED

LUBRICATOR CUPS,



First Prize at Fair American Institute and Millers' Interna'l Exposi'n, Cincinnati, 1880.

for oiling valves and cylinders of steam engines by the only perfect method, **through the steam pipe.** The oil passes in sight, drop by drop, into the column of steam, where it vaporizes, thus becoming a steam lubricant, oiling perfectly every part reached by the steam. Any clean oil, black or white, light or heavy, may be used. Saves from 40 to 90 per cent. in oil and wear of machinery, thus paying for itself several times a year. A cup will be sent to responsible parties on 30 days' trial if desired. In ordering, give diameter of cylinder.

Note.—In our recent suit against the American Lubricator Co., of Detroit, before Justice Stanley Matthews, of the U. S. Supreme Court, involving their "sight feed" feature, a decree was rendered in our favor August 20, 1881. Address,

DETROIT LUBRICATOR CO.

Office, 129 GRISWOLD ST., Detroit, Mich.

Mention *The Iron Age.*

them is crushed before it has an opportunity to escape. The principle is said to be an exceedingly good one, and the work done of a superior character. Like all good stone breakers, the quantity produced is astonishing.

Post & Co., 161 West Pearl street, Cincinnati, Ohio, showed a variety of headlights, from a small galvanized iron affair 17 inches in diameter, up to the largest size of their adjustable headlights. The largest sizes of these are mounted on their swinging frame in such a way that the lamp can be lighted without the necessity for opening the door. They have headlights with Nicholson's side signal numbers, and with a variety of improvements, among others a match-striker for headlight burners, by the use of which the match is lighted after it is inserted within the burner. The workmanship throughout of these burners is exceedingly perfect. They are made in a great variety of styles and are exceedingly powerful.

Of hand-cars, velocipedes and otherwise, there was a great showing at Chicago, and an evident attempt had been made to provide light, strong and swift cars which would require but a small effort to propel them at a high rate of speed. Judging from appearances, this effort had been successful, and there were a number of cars on exhibition which seemed to fill the bill to perfection.

Barnum, Richardson & Co., Salisbury, Conn., had an exhibit of iron ore and charcoal pig iron which attracted a good deal of attention. They prepared a pamphlet for distribution in which analyses, &c., of their ores were given, together with tensile strength, &c., of metal made from it. We tested some of this iron very carefully half a dozen years ago, and found it of the most extraordinarily good quality. Some test pieces cut from the pig behaved very much more like wrought than cast iron, and after reaching their maximum tensile strain fell off several thousand pounds before breaking. When tested in a Thurston torsional machine they gave, of course, a very short curve, but one which had decidedly more resemblance to wrought than to cast metal, the break taking place some distance after the maximum had been reached, and the iron twisting through several degrees before parting.

One of the novelties at Chicago was the Miltimore elastic steel car-wheel. The company's address is 51 Dearborn street, Chicago. The idea of the wheel is a most peculiar one. A steel tire is supported by a series of spokes, held in place by a hub, in some respects resembling that of an ordinary wagon hub. The spokes are flat bars, but are twisted through half a revolution and have a hole punched through them at the point where the twist takes place. This results in giving them a certain amount of elasticity. Each spoke is held in place by a shallow mortise in the tire of the wheel, and a pin or dowel projecting from the spoke. The wheel is exceedingly ingenious, and the samples we saw very well made. Mr. Miltimore, the inventor, has had a long experience in railway matters, and his work cannot be classed with that of the amateurs; hence we shall look with a good deal of interest to the performance of this very remarkable piece of mechanism.

One of the most original cushioned wheels was the Cooper, shown by the Boston Standard Wheel Co., Boston, Mass. Here we have a steel tire held upon a cast-iron center by a most peculiar method of construction. The tire slips over the center in such a way as to make a tight joint at the two faces, but leaves a thin opening at the center all the way around the wheel. Into this opening india-rubber is forced by hydraulic pressure through several openings made in the cast-iron center. The rubber is then vulcanized in the ordinary way by submitting the wheel to heat. The union between center and tire is, of course, exceedingly perfect, and little danger would be anticipated from loose tires. It is claimed that by this construction a sufficient amount of elasticity is obtained, and that such wheels cannot be broken by use. They are guaranteed to make a mileage of 500,000 miles, and there seems little reason to doubt their ability to do so.

One of the inventions shown at Chicago was an improved closet ventilator, by which, when the car was in motion, a continuous downward current of air was maintained through the hopper of the closet. This was accomplished merely by the use of proper deflectors in front and behind the hopper opening. It is a simple affair, it is true, but it would be a great source of comfort to travelers if something of the sort could be universally adopted.

W. G. Creamer & Co., 96 John street, New York, had an exhibit of their ventilators and other car goods which was worthy of notice. Some of the new basket racks were exceedingly pretty and in good taste. A question, however, was raised the other day in regard to basket racks which it might be well for manufacturers of them to consider, and that was whether a folding rack could not be made which would be just as serviceable and more ornamental than those at present in use. Generally only two or three racks in a whole car are occupied, the others projecting and occupying space to no purpose. A folding rack would, of course, be quite as useful when wanted, and would give, when shut back against the side or head lining, a much better appearance.

The Washburn Steel Car Wheel Co., of Hartford, Conn., had a fine exhibit of steel-tired cast-iron wheels. These wheels, our readers will remember, are of a peculiar character. A very hard crucible steel tire is made in the ordinary way by hammering and rolling, then dropped into a mold and a cast-iron center poured into it, which welds itself thoroughly to the hot steel tire. This process enables a very hard and durable tire to be used with safety. The mileage of these wheels is quite extraordinary, and a sufficient number of them have not been worn out, though some of them have run 520,000 miles, to enable a fair estimate to be made in regard to their average life.

Geo. R. Meneely & Co., West Troy, N. Y., had a very neat exhibit of Hopkins's lead-lined journal bearings. Those who have not had much experience in the use of a lead-lined brass have little idea of the peculiar advantages which it has over the unlined boxes, no matter how carefully they may be finished. The wearing surface of a lead-lined box, we think, shows a greater perfection than can possibly be obtained by any single metal. The lead seems to fill up the pores of the brass, cement the particles worn off into place, and secure a perfection of the surface not possible with plain bronze. Their performance on railroads has been extraordinary, and ought to be sufficient to convince any one of their very great advantages,

The Anglo-American Roofing Co. showed some very pretty samples of metallic roofing and shingling, and also some corrugated sheet-iron siding especially adapted for large buildings, like grain elevators, &c. This siding is applied in such a way that it is not affected by the settling together of the walls. The V-shaped grooves are 4 inches apart and the sheet is 26 x 32 inches. Other sizes, however, can be had if desired.

The Iron Mines of Michigan.

In his annual review of the iron mining and other industries of the upper peninsula of Michigan, Mr. A. P. Swineford submits the following interesting facts relating to the iron mines of that State:

In the summer of 1845 a discovery was made which afterward developed into what is now known as the Jackson mine, situated within the corporate limits of the city of Negaunee. The first ore was mined in 1846, and the first iron ever made from upper peninsula ore (except a small bar made in a blacksmith's forge) was turned out at the old Jackson bloomary, which was situated a few miles east of Negaunee, on the Carp River, in February, 1848. The first shipment of ore from the upper peninsula comprised about five tons, which was sent to Newcastle, Pa. A test of these five tons served to attract the attention of Pennsylvania and Ohio ironmasters to this new field of supply for their furnaces; but, nevertheless, comparatively little was accomplished toward its development until, in 1852, about 70 tons of Jackson ore was sent to the "Old Clay" Furnace, at Sharon, Pa., which had the honor of making the first pig iron from Lake Superior ore. Regular shipments to lower lake ports did not commence, however, until the summer of 1855, in which year the St. Mary's Falls ship canal was so far completed as to afford an outlet to the lower lakes. From June, 1855, therefore, dates the actual history of iron mining in the upper peninsula, though some thousands of tons of ore had been mined and manufactured into blooms at the Jackson, Forest, Collins and Marquette forges previous to that date.

The first ore was hauled to the lakeside, at Marquette in wagons, over a rough wagon road, until the completion of a plank road in 1856, which was subsequently converted into a tramway, this being in turn superseded by a railroad (now a part of the Marquette, Houghton and Ontonagon), which was completed to the Jackson and Cleveland mines in 1857. Previous to the completion of the railway to those mines, there had been shipped to and smelted at the three forges referred to 52,000 tons of ore, and the primitive condition of the mines, together with the uncertainty of the market at that early day, may be inferred from the fact that the entire output of the district in 1858 was only 22,000 tons. This product was increased to 68,832 tons in 1859, and when, in 1860, a product of over 100,000 tons was achieved, those interested in the development of the region began to prophesy future results which, though wild and visionary they may have then been considered by many, have since been more than realized. In 1860 the entire aggregate production of the district had reached 348,074 tons, an annual product of 200,000 tons not being arrived at until 1864. Since then the annual product has been steadily increased, until we have to report the enormous output of 2,336,335 gross tons in 1881 and 2,943,314 gross tons in 1882.

Picking up Broken Cables.—The laying of telegraphic cables, says the *Electrical Review*, is now so common that the description of the machinery for picking up a broken one will be read with interest. It consists of a rope about 1¼ inches in diameter, made from the strongest hemp, with interwoven wires of fine steel. The grapnel at the end is merely a solid shaft of iron some 2 feet long, and weighing about 100 pounds, and prolonged into six blunt hooks, which much resemble the partly closed fingers of the human hand. In picking up the cable in deep water, the Minia, after reaching the waters near the break, lets out her rope and grapnel, then takes a course at right angles to the cable and at some distance from the fracture, so that the broken ends may not slip through the grapnel. The grapnel rope is attached to a dynamometer, which exactly measures the strain on the rope, and shows unerringly when the cable has been caught. If the grapnel fouls a rock, the strain rises very suddenly to a high point; but the exact weight of the cable being known, the dynamometer signals by the steady rate of increase its hold on the cable far below. The ease and certainty with which cables are picked up in these days is amazing. A while ago one of the lines of the Anglo-American Co. was caught without trouble, at a depth of 2¼ miles, near the middle of the Atlantic. Captain Trott, of the Minia, who has won great fame for his skill and ingenuity in cable matters, but recently picked up the French cable 180 miles off St. Pierre, and in four hours from the time the grapnel was let go had the cable spliced and in working condition. The splicing is a work of great delicacy and skill, and when accomplished by trained fingers the spliced part can scarcely be distinguished from the main cord.

It is claimed that the largest gas main in the world is now being laid through Westminster, England. Its diameter is 4 feet, and more than 23 miles of this 4-foot main in four diverging lines have already been laid, the work having been begun 10 years ago. It is thought that some interesting experimental data on the flow of gases through large, long pipes might be obtainable from this.

The Iron Age

AND

Metallurgical Review.

New York, Thursday, July 19, 1883.

DAVID WILLIAMS, - *Publisher and Proprietor.*
JAMES C. BAYLES, - *Editor.*
JOHN S. KING, - *Business Manager.*

RATES OF SUBSCRIPTION,
INCLUDING POSTAGE.

THE UNITED STATES, BRITISH AMERICA AND SANDWICH ISLANDS.

Weekly Edition.....**$4.50 a year.**
Issued every THURSDAY morning.
Semi-Monthly Edition..... **$2.30 a year.**
Issued the FIRST and THIRD THURSDAY of every month.
Monthly Edition..... .....**$1.15 a year.**
Issued the FIRST THURSDAY of every month.

TO ALL OTHER COUNTRIES,
PER ANNUM, POSTPAID.

Weekly Edition: $5.00=£1=25 francs—20 marks—12 florins—6 roubles (coin)=25 lire—20 pesetos.
Semi-Monthly Edition: $2.50=10/=12½ francs—10 marks—6 florins—3 roubles (coin)=12½ lire—10 pesetos.
Monthly Edition: $1.25=5/=6¼ francs—5 marks—florins—1½ roubles (coin)—6¼ lire—5 pesetos.

REMITTANCES
should be made by draft, payable to the order of David Williams on any banking house in the United States or Europe; or, when a draft cannot be obtained, in postage stamps of any country.

NEWSDEALERS OR BOOKSELLERS
in any part of the world may obtain *The Iron Age* through the American News Company New York, U. S. A; the International News Company, New York, U. S. A., and London, England; or the San Francisco News Company, San Francisco, Cal., U. S. A.

RATES OF ADVERTISING.
One square (12 lines, one inch), one insertion, $2.50: one month, $7.50; three months, $15.00; six months, $25.00; one year, $40.00; payable in advance.

BRITISH AGENCY.
Office of THE IRONMONGER, 44a Cannon st., London.

DAVID WILLIAMS, Publisher,
83 Reade Street, New York.
PITTSBURGH.....77 Fourth Avenue,
JOS. D. WEEKS, Manager and Associate Editor.
PHILADELPHIA.....220 South Fourth Street.
THOS. HOBSON, Manager.
CHICAGO.....36 & 38 Clark st., cor. Lake.
HENRY SMITH, Manager.
CINCINNATI.....66 West Fourth Street.
CHATTANOOGA.....Eighth and Market Streets.
S. B. LOWE, Manager.

SOLE AMERICAN AGENCY FOR
THE IRONMONGER,
Published at 44a Cannon St., London.
The oldest and leading representative of the British Iron and Hardware Trades.
Subscription, Postpaid.....**$5.00**
to countries outside of Great Britain, including Monthly Foreign Supplement of one copy of Iron monger's Diary.
By a mutual clubbing arrangement between the two journals, subscriptions to both will be received by either *The Ironmonger* or *The Iron Age* on the following terms:

THE IRONMONGER and THE IRON AGE, Weekly.
In the United States and Canada.....$7.50 or £1. 10s
In Great Britain and Ireland..... 5.50 or 1. 2s
In other countries. .... 8.00 or 1. 12s
THE IRONMONGER, Weekly, and THE IRON AGE, Monthly.
In the United States and Canada..... ...$5.75 or 23s
In Great Britain and Ireland..... ... 3.25 or 13s
In other countries..... ..... 5.75 or 23s

Importations of Iron Ore.

The new tariff makes a difference of 25 or 30 per cent. in favor of American iron ores, and is quite sure to lessen importations of the inferior grades. But there will be little change in the importations of Bessemer grades, which have long paid about the same duties as now. Another question of some interest relates to the plans of the gentlemen who contemplate importing iron ore from Cuba. A railroad is now in progress from these mines to the coast, and it will soon be opened. But how a profitable business can be done in these ores does not yet appear. At the present prices of finished material ores must be very low in prices to be purchased here at all. It is certain that consumers will buy if they can afford to, and not otherwise. Heretofore, importations of iron ore have depended mainly on the condition of the grain trade, grain being relied upon for a return cargo, so that when our exports of corn or wheat were heaviest, ore freights ruled low and importations of ore were correspondingly large. All this is changed now, and has been for the last two years, so that the promised revival of grain exports, as a consequence of low prices, no longer enters into the calculation. Ore importers simply ask "What can we lay it down for in this market?"

Philadelphia is pleased just now in prospect of the arrival at that port of nine ore-laden vessels, a somewhat unusual occurrence, the diversion to New York and Baltimore during the last three years having been almost complete. Pittsburgh, as is well known, consumes largely of foreign ores for foundry and Bessemer purposes, and the Baltimore and Ohio Railroad has afforded specially favorable rates to several important establishments, thus taking the lion's share. New York, however, has held her own very well in the competition, as appears from the following table, showing the total importations of ores for the last three years:

	1880. Tons.	1881. Tons.	1882. Tons.
Baltimore..	170,308	375,798	243,182
New York.....	148,987	126,419	145,909
Philadelphia.	120,619	155,564	111,044
Other ports.....	53,494	55,106	89,020
Total.....	493,408	782,887	589,655

New York shippers claim that freights are 50 cents to $1 in favor of this city, compared with Philadelphia. Some 50,000 tons of ore will be due here before January 1st, of which three cargoes are on their way. Beyond this there are no definite expectations, and nothing to encourage a belief that the business can prosper. African ores are shipped hither, because they are in the hands of a syndicate who simply watch the state of the market. The capital employed is English and French.

The present relations of the tariff appear from this simple statement: Heretofore all crude minerals paid 20 per cent. ad valorem, the average duty being about 56 cents. The new tariff imposes 75 cents specific duty, making the actual increase 19 cents, or, say, 20 per cent. But the importing interest is likely to suffer much more seriously from the competition of domestic ores of high grade than from any change in the tariff. This competition is strongest within the area of country where the foreign ores are most in demand. The Bessemer ores of the Hudson River Valley and the Adirondack region will bear transportation far enough West to meet the Lake Superior and Missouri ores coming East, and the abundant ores of Tennessee, Virginia and North Carolina will soon come far enough North to supplement any deficiency which they are adapted to fill. In the face of this domestic competition, the area of country profitably open to foreign ores would seem to be growing very small.

The Metal Brokers' Association.

The metal brokers of New York are now organizing an association with objects which commend it to the favorable consideration of all branches of the trade. It has been needed for a long time, both for the definition of the status of a broker and for his protection, as well as for the protection of the merchants with whom and for whom he does business. During the past few years the conditions under which a brokerage business in metals is conducted have changed very much. The broker is required to assume important responsibilities, and, even though abstaining from transactions in which he figures as principal, he must in many cases conduct large operations in which the security of the seller depends entirely upon the responsibility of the broker. It is important, also, that the merchants should know who are legitimately brokers and who are not. This is especially necessary now, as it is by no means unusual for merchants' clerks and others having access to the floor of the Metal Exchange to engage in little operations as amateur brokers whenever an opportunity offers to make a commission, as principals when they see a chance for a little speculation, and as clerks when they are doing business for their employers. There is also need of some organization of brokers to which only those actually in the business as brokers, and who are properly qualified by knowledge and experience to act in that capacity, can secure admission or claim recognition. It will be understood of course, that membership in such an association in no sense changes the legal status of a broker, nor does it hinder any one not a member from going into the business if he chooses to do so. But it will undoubtedly go a good way toward protecting brokers from the competition of "amateur casuals" on 'Change or in the street, and toward protecting merchants against being caught in traps laid for them by men who make claims for commissions for services either not rendered or rendered in such a way as give them a legal claim to compensation for which they have no moral claim. We have known a great many cases in which merchants have had to pay commissions recovered by suit for services they were not aware were being rendered. Such claims have gone far to bring the brokerage business into disrepute, and to embarrass the legitimate brokers in the discharge of their business.

The organization now forming has no necessary connection with the New York Metal Exchange, as it will probably include many brokers who are not now members of that organization. There is every probability, however, that it will be officially recognized by the exchange, and that its rules will govern the business between brokers on its floor, as well as that between brokers and merchants. If we are correctly informed as to the plan of organization proposed, it is not intended to make the association a close corporation, nor to exclude any one who has a right to claim admission. It will, however, be limited to those who are legitimately in business as brokers, and only as brokers, and those who, upon evidence of good character and proper qualifications, desire to become brokers. Its rules will undoubtedly be recognized as defining the trade usages, and will be respected by the courts in suits growing out of brokerage transactions. The brokers seek no advantage through organization which they do not now enjoy in the course of regular business, but the reorganization of the exchange has rendered such an association necessary, and if its rules are as wise and reasonable as we expect they will be, we shall be surprised if it does not do much to harmonize the elements, to some extent conflicting, which are represented in the membership.

Many will perhaps be surprised to learn that Captain Eads's much-talked-of ship railway across the Isthmus of Tehuantepec has been begun. Captain Eads, having changed the views formerly held regarding the project, has secured ample grants from the Mexican Government to permit the prosecution of the work, and ground was broken at the Atlantic terminus of the railway, in the latter part of May, some 150 miles southeast along the Mexican coast from Vera Cruz, almost directly south of Galveston and a little south of west of New Orleans.

Smoke Prevention.

It will perhaps be remembered by many that the difficulty experienced in Cincinnati some time ago in connection with the smoke nuisance led to the adoption of an anti-smoke ordinance, and the appointment of an inspector, Mr. Clement Olhaber, to enforce it. The labors of the latter, however, do not appear to have been rewarded with material success, and though some abatement of the evil may have been effected, the general opinion still is that there is now as much smoke as ever. An assertion of no little importance, as affecting the smoke question, is now made by a Western paper, which states that the impracticability of the ordinance passed in Cincinnati consists in one word—it requires all furnaces to "consume" their smoke, a thing which, as is generally known, cannot be done. Change "consume" into "prevent," remarks the inspector, and the ordinance will be of some use, for smoke can be prevented, though not consumed. The trouble thus far experienced would seem to us to have arisen from the fact that the term "smoke," in its widest application, is generally made to include all the products of combustion issuing from the chimney, while, in reality, it should be restricted to the particles of solid carbon mingled with the escaping gases or sooty portions only of the escaping products. It is a generally-known fact that when coal is thrown upon a fire the effect is to break off small pieces here and there, owing to unequal expansion, and the strong draft created by the chimney is sufficient to carry off these particles with the products of combustion. It should further be remarked that as very few analyses of smoke are on record, there is a generally mistaken notion as to the percentage of carbon thus carried off and present in the smoke, and its proportion has been so generally overrated that within a few years the markets have literally been flooded with numbers of so-called smoke consuming devices. In very many cases these inventions have been accompanied by most absurd claims as to their efficiencies in the way of consuming smoke and the consequent saving in fuel. We are glad to note, however, that the impossibility of consuming smoke is being more generally understood. As very properly suggested by the Cincinnati smoke inspector, the whole matter lies in the hands of the stoker or fireman, and it is he that makes all the smoke by firing in a clumsy and slovenly manner, smothering the fire with quantities of fresh coal thrown on so as to convert it into a bank of half-extinguished fire which can do nothing but smolder. An even distribution of the fuel by adding it in small quantities will do much to insure a satisfactory result, and the inspector's plan is to require every fireman in the city to have a license, and before he is granted the license to subject him to a practical examination to test his ability for the work on hand. If, in the regular course of his business, a licensed stoker should permit his chimney to smoke, he should be subject to a fine, with the prospect of having his license taken away.

In order not to convey a wrong impression of our estimation of the value of smoke-preventing devices, we would state that there are a number now in use which justify many of the claims made for them. These devices are so arranged that when burning any fuel rich in hydrocarbon a sufficient quantity of air can be admitted to convert the carbon into carbonic acid, and still maintain a high temperature in the furnace. They are, as the rule, provided with regulating devices for the admission of air, and in several which are known to us the supply of air is divided into two portions, one for the fire-box and the other for the combustion chamber. As a general thing, smoke prevention in poorly-constructed furnaces is attended with great practical difficulties, the principal one being the admission of air over the fire in a sufficient quantity to convert the small particles of carbon into carbonic acid, and at the same time not lower the temperature of the furnace. In admitting air above the fuel, unless it can be supplied at a high temperature, it may be a worse evil than the smoke itself by lowering the temperature of the gases in the furnace to a point below which ignition is insured. In stationary boiler furnaces a number of different plans have been carried into effect, with the aim of producing satisfactory results, and one of the most common plans has been to lengthen the grate by carrying the bridge wall further back. In this manner, as will readily be seen, an increased grate surface and a slower rate of combustion are attained, and this, together with intelligent firing, may be a means of largely reducing the escape of soot and carbon. Fire doors having perforations, fan-blasts in connection with closed ash-pits, and several other methods, have also been tried and have been productive of more or less gratifying results. Many of these methods reduce the quantity of smoke, and some even prevent its formation entirely.

We are not in the least surprised that Mr. Olhaber's official work in Cincinnati has been attended with unsatisfactory results. He has done the best he could, but he has been handicapped by an imperfect law, and only in part sustained by public opinion. The only way this question will ever be met is by an ordinance forbidding the production of smoke in furnaces, and leaving to furnace owners the adoption of means for the suppression of the nuisance. It can be done; furnace owners know it, and when they are prevented from maintaining the public nuisance of smoky chimneys, they will not need a bureau of experts to tell them how to avoid smoke. A mandatory enactment without conditions would not be a hardship, and would promptly settle the whole trouble.

The Condition of the Stove Trade.

Mr. John S. Perry, of Albany, has compiled from reports submitted at the meeting of the National Association of Stove Manufacturers, held at Niagara last month, an interesting and valuable report showing the condition of the stove trade in different parts of the country. The extent and importance of this industry, and its intimate connection with the production and distributive interests represented by *The Iron Age*, entitle this report to some consideration in our columns.

Mr. Perry's report shows that while the situation of the stove business is relatively better in some parts of the country than in others, its general position is not as unsatisfactory as many have supposed. In the New England States the productive capacity of the stove foundries has been increased from 15 to 20 per cent. within the past six months, but the entire capacity has not been used, and the increase of production during this period is probably not more than 5 per cent. New York founders have increased their facilities for production very little, say 1 per cent., and those of Pennsylvania not over 5 per cent., but, owing to stoppages from one cause or another, New York's production shows a falling off of 10 to 15 per cent., and that of Pennsylvania about as much. South of the Ohio River the facilities for production have been increased from 20 to 25 per cent., but the production shows only 10 to 15 per cent. increase as compared with the first half of last year. In the Northwest the foundry capacity shows an increase of 20 per cent., with 5 per cent. increase of production. Averaging the reports, Mr. Perry concludes that the foundry capacity of the country is at least 12½ per cent. greater than at this time in 1882, but that the production does not show any increase. This would seem to indicate that manufacturers are disposed to follow a conservative course, and to keep stocks well in hand.

In New England the sales up to June 30th were found to be from 7½ to 10 per cent. less than during the same time last year. In New York they were about the same as last year. In Pennsylvania they show 10 per cent. less distribution. South of the Ohio River the sales are about the same as last year. In the Northwest the sales are 10 per cent. less. Averaging these reports, Mr. Perry finds that sales up to June 30th were about 7½ per cent. less than last year. This does not prove as much as it might seem to at first glance. Last year dealers were somewhat too precipitous in placing orders and ordered somewhat too heavily. This year it is natural we should experience something of a reaction. Every year the dealer feels safer than he did the year before in placing his orders late and with caution. The increasing competition and the establishment of warehouses in the West with large stocks, greatly promote the dealer's convenience in this matter. Better facilities for rapid and cheap transportation enable him to replenish his stock with frequent and small orders, and so keep his stock and his indebtedness well in hand. He hears a good deal more about the inability of makers to fill orders than he knows about from experience, and is not by any means easily frightened by the suggestion that unless he buys early and largely he may "get left." What he wants to avoid most is finding himself "left" with a large stock in his cellar and no money to pay his four months' notes. The whole policy of management in the stove trade is calculated to encourage delays in purchases on the part of the dealer, and considering the fact that last year many dealers purchased somewhat too liberally, we are surprised that the falling off in sales is not more than 7½ per cent. Later sales will probably bring up the average.

As to stocks, Mr. Perry's data are probably somewhat incomplete, but they are the best available. In the New England States, according to the report, manufacturers are carrying 5 to 7½ per cent. more stock than at this time last year, but dealers' stocks are light—probably no greater than at this time last year. In New York manufacturers carry 10 per cent. larger stocks; dealers carry no more, if as much. In Pennsylvania manufacturers' stocks are 15 per cent. greater; dealers' stocks about as last year. South of the Ohio manufacturers' stocks are 25 per cent. greater; dealers' stocks are 10 per cent. less. In the Northwest manufacturers carry 10 per cent. larger stocks; dealers about the same as last year. The light spring trade accounts for the size of manufacturers' stocks, as well as for the fact that dealers are not oversupplied. The increase in the oil and vapor stove business, which is not noted in these statistics, has had an important influence on the spring and summer trade in other classes of goods. Averaging the figures, Mr. Perry finds that the stocks in manufacturers' hands are 12½ per cent. greater than at this time last year; stocks in dealers' hands are light. This is really the normal condition of things. Under the present system manufacturers have to carry the stocks, and their season of distribution is every year becoming shorter. Their business requires more capital than formerly, but it is safer than if based upon a more extended credit.

Prices, according to the reports, have been fairly well maintained, except in the Northwest, where they have been from 2 to 3 per cent. lower. Mr. Perry ventures the assumption, however, that prices have averaged 2½ per cent. lower than last year, and in this we think he is quite within the truth. However, it is a cause for congratulation that nothing like a panicky feeling has existed in the trade. The situation is by no means discouraging, and the upward tendency of foundry iron will probably correct any disposition which might exist with a weak iron market to "sell at any price." Mr. Perry concludes his report with a statement of his opinion that with iron at $20 per ton, stoves of average assortment cannot be made under $100 per ton, exclusive of nickel and extra trimmings. Every one in the trade will agree with him that stoves are sold too cheaply, but there seems to be no way in which the average price can be advanced, and the problem will have to be left to work itself out by the operation of natural laws.

British Colonial Trade.

A pamphlet recently published in England, and relating to the manufactured exports from Great Britain to European States and other foreign countries, including the United States, gives some comparative figures which are suggestive. It appears that while the exports to foreign countries have been steadily declining for the last ten years, the exports to the British Colonies, especially Australia and New Zealand, have more than made up the loss, as shown in the appended figures:

	To foreign countries.	To Colonies.
1870...	$446,800,000	$222 000,000
1880.....	426,500,000	242,500,000
Decrease.....	$19,500,000	... .
Increase....	... .	$70,500,000

The value of the total export and import trade of Great Britain to foreign countries and the Colonies from 1873 to 1877 is given as follows:

	With foreign countries.	With Colonies.
1873.....	$2,650,000,000	$760,000,000
1877..... ...	2,410,000,000	825,000,000
Decrease.....	$240,000,000	..... .
Increase.....	....	$65 000.000

This statement, then, shows an appreciable diminution in the entire trade, amounting, as shown, to $175,000,000 in five years, while the Colonial trade, on the other hand, shows a remarkable increase during the same time. The trade of England with most other foreign counties declined about 9 per cent. from 1873 to 1877 inclusive. As to France, Belgium, Holland, Sweden and Norway—among the best customers of England—the decline was about 4½ per cent. in the five years. New Zealand, Tasmania and Australia, though numbering not more than 3,500,000 inhabitants, are classed among the best Colonial customers, and owing to the probability of their extended future development, the outlook for a large increase of British trade in that direction is not without promise.

The Late Rise In Silver.

The sudden rise in the price of silver during the latter half of June, this year, of ½d. per ounce in the London market, invites attention. The production of silver, as compared with that of gold, last year, has been, according to English estimates, as under:

	Gold.	Silver.	Total.
America.....	$41,000,000	$83,250,000	$123,750,000
Europe.....	33,000,000	3,800,000	36,800,000
Asia.....	3,000,000	6,000,000	9,000,000
Australia and Africa	41,000,000	1,950,000	42,950,000
Total	$118,000,000	$94,000,000	$212,000,000

Toward the above the United States contributed $32,500,000 gold and $46,800 000 silver; Mexico, of the latter, $24,000,000. In other words, these two countries have furnished about 49 per cent. of the entire product of the precious metals combined. During the past 30 years the annual gold product has decreased one-half, while that of silver has doubled. The only country where gold production has increased rapidly since 1877 is Russia, whose product last year was estimated at $30,000,000, although, according to the official statistics collected by Mr. Ibanoff, Russia produced 57,000,000 roubles' worth of gold in 1882, which would be equal to about $42,000,000. Since 1877 the Russian Government has ceased to tax the mining industry heavily, and instead has leased to private individuals all the Government mines, with the exception of those of Nertshinsk and Altai, the property of the Imperial family.

In order to reconstitute the gold circulation of the United States, Germany and Italy, Mr. Goschen estimates that there have been required no less than £200,000,000, of which the United States absorbed £100,000,000, Germany £84,000,000 and Italy (quite recently) £16,000,000. He states that the annual production of gold from 1852 to 1856, inclusive, was £30,000,000; 1857-61, £24,600,000; 1862-66, £22,750,000; 1867-71, £21,753,000, and 1871-75, £19,200,000; hence he calculates that the above absorption for circulation purposes took away the entire product of the world during 10 years. He concludes from this that gold is getting scarce, comparatively speaking, and that its purchasing power increases; that, consequently, the value of commodities has fallen, and falls in proportion, and he endeavors to prove so by comparing the prices of a number of them in 1883 with those in 1873. Adding, however, the $12,000,000 gold which Russia actually produced over and above the English estimate of $30,000,000, we arrive at a total gold product in 1882 of $130,000,000, or £26,000,000. While silver production for

the moment does not expand, gold production recovers. This has, however, not prevented silver from declining to 50d. per ounce early in the present year, in consequence of heavy sales of India treasury bills and a large silver exportation from Mexico after the export duty had been abolished there. But as early as March this year silver recovered to 51 1/16d. per ounce, and thence again receded to 50 1/16d., from which in June last it suddenly rose again to 50¼d., stimulated by the demand for silver in India.

Between 1862 and 1881 India absorbed no less than £100,000,000 worth of silver, and the discount at the banks of Bengal and Bombay rules, for the present, the silver market, the Bank of Bengal having changed its rate no less than seven times last year. India is, in fact, the only country outside of the United States where silver is absorbed at present to any very great extent. In England, on account of mint repairs, the coinage of silver was last year limited to £209,880, against £997,128 in 1881, £761,508 in 1880, £549,054 in 1879, and £613,998 in 1878. Austria has reduced its silver coinage to 7,000,000 florins per annum ($2,800,000); Italy has resumed specie payments with the amount of gold above alluded to. Holland is about to sell 25,000,000 guilders' worth of silver two-guilder pieces and replace them by gold ($10,000,000), at a loss of 20 per cent. on the silver. On January 1, 1882, the Bank of the Netherlands still held 18,500,000 guilders' worth of gold; a year later only 5,500,000, but it has since bought enough to constitute a stock of 46,000,000 guilders, and is therefore in a good position for the change above indicated.

France has also gradually improved her gold position, for in all 1882 gold in the Bank of France increased 300,000,000 francs ($40,000,000), and since then it has again increased 32,000,000. It is now close upon 1,000,000,000 francs ($200,000,000). In Germany, during the late session of Parliament, Deputy de Kardorff, the bi-metallist agitator (middle of June), urged that body either to again try to arrive at an international understanding about fixing the proportion of value between gold and silver, or to sell the old thalers still on hand at once. Till recently he, on the contrary, insisted that the *status quo* should be upheld, and the old thalers left unsold. This change of front is significant, and has caused general surprise. Parliament having taken no action, the matter rests for the moment where it is. Perhaps it would have been better to sell this old coin now. Although for the moment the demand for India has again given a slight lift to silver, the general impression is that since nearly all nations want to get rid of it, the future of its value is anything but reassuring, even supposing that the production remain stationary for some years to come. Much may depend on the action of our Congress. Should they change the policy with respect to silver coinage now in force, silver may suffer a depreciation even greater than the one it has taken six years to partially recover from. As for the theory of Mr. Goschen—that gold, through scarcity and an extra demand, produces a general lowering of values—we beg to remark that as an abstract theory the conclusion would be correct, but that the prices he compares (those of 1873 and 1883) will hardly serve as a fair argument. In 1873, just prior to the panic, prices of everything had been run up very high, whereas this year is commercially a highly unfavorable one in point of prices so far, except in a few articles of food still kept up by pure speculation. If Mr. Goschen compared the prices of 1874 with those of 1883, he would find that the difference is not great, on the whole; but we repeat that, as we have shown, gold production between this country, Russia and Australia is ample at present, and sufficiently so, we believe, to answer all current monetary and industrial requirements.

The fact that the Anglo-American Roofing Co., of Wolverhampton, England, will shortly commence to dismantle the greater portion of their plant for transportation to Pennsylvania, would seem to be a forcible illustration of how legislation affects trade.

The returns of immigration at all the ports in the United States during the month of June show a continued decrease since the beginning of the year. The following is a comparison for the first six months of the last four years:

	1880.	1881.	1882.	1883.
January	12,000	13,134	18 489	19,940
February	14,000	15,075	28,247	17,085
March	40,613	44 125	65,234	38,730
April	46,821	95,300	104,274	78,475
May	55,250	117,482	141,025	99,601
Juue	140,576	95,073	84,786	75,034
Six months	309,260	380,879	442,065	321,845

Included in the 75,034 which arrived in June, 20,630 came from Germany, 11,741 from Ireland, 9437 from England and Wales, 6464 from Sweden, 5239 from Canada, and in less numbers from other countries.

San Francisco at present boasts of having on exhibition a very interesting collection of products of Honduras brought to that city by President Soto, of that Republic. The object of the display is to advertise the products of Honduras, to the end that capital may be induced to assist in the development of the country. Considerable progress has been made in this direction within the past few years, but there is still room left for further improvement. The collection mentioned comprises fibers, grasses, spices, specimens of coffee, precious stones, metals, &c., and will be exhibited in Chicago, New York, London and Paris, after leaving San Francisco.

Cast Iron of Unusual Strength.

We have the following interesting letter from N. Gridley & Son, on the comparative qualities of "Wassaic carbonate" and "Muirkirk" pig irons:

WASSAIC, N. Y., July 11, 1883.

To the Editor of The Iron Age.—DEAR SIR: We note your remarks, on page 25 of *The Iron Age* of July 5, in relation to relative strength of "Wassaic carbonate" and "Muirkirk" irons. One important question in connection therewith is not fully settled in our minds, viz.: Was the Muirkirk test of 47,756 pounds per square inch made from iron direct from the pig bed, or was it remelted iron? These are very high figures for either, but what leads us to think that this report was made on remelted iron—and if so, it should not be put in competition with ours—is the fact that Mr. Coffin's highest figure reported in the *Journal* of the Charcoal Iron Workers (see Vol. III, page 185) was 42,300, and his advertisement in the *Journal* gives, average of 6 pieces, 41,329. Our average of 13 samples, none of them from remelted iron, was 41,349, and if we are not ahead of Mr. Coffin, and every one else, we are willing to take second place until we can win the first. Are we second? The roasting and smelting of this ore is a new experience for this region, and we have not yet received any reports of tests made from remelted iron. Very respectfully,

N. GRIDLEY & SON.

METALLURGICAL NOTES.

The Manufacture of Magnesia Bricks.

The following methods are described by Mr. Massenez, of Hörde, Germany, as in use for the purpose of producing caustic magnesia bricks for the basic process: The advantage of this material over calcined dolomite is due to its indifference to water, so that it can be rendered plastic and molded wet without becoming hydrated, as is the case when lime is present. There is an objection to the use of limings made from natural magnesia, partly on account of the expense, but more particularly on account of the notable proportion of silica present, which is likely to have a fluxing effect at the high temperatures in use in the steel furnaces.

The first method, that of Mr. Prosper Clonan, is applied in the treatment of the waste water of the potash works at Stassfurth, which contains 372.7 grains of chloride of magnesium per liter. These, when heated with burnt dolomite, are decomposed according to the following reading:

$$Mg\,Cl_2 + CaO\,MgO = Ca\,Cl_2 + 2MgO.$$

The process is effected by mixing ground dolomite with water and the magnesium chloride liquor, and heating the mixture in vats with agitators until the carbonic acid is completely expelled, which is very quickly done; the precipitated hydrated magnesia is then washed, pressed and dried. As it is perfectly plastic, it can be readily molded.

Another method of equal simplicity, but which has the further advantage of being available wherever dolomite can be got, has been recently described by Prof. B. Scheibler, of Berlin, who removes the lime by digestion in weak solution of sugar. The method is as follows: Dolomite, previously diffused through water, is mixed with syrup containing 10 to 15 per cent. of volume by sugar, and heat is applied until the carbonic acid is expelled. In a few minutes soluble saccharate of lime is formed, while the magnesia separates as hydrate, and may be collected by decantation. By heating the solution the saccharate of lime is decomposed and lime precipitated, so that the sugar solution is renewed, and can be used for the further decomposition of dolomite with success. Both of the above methods have been tried with success at Hörde, and the cost appears to be about equal in either case, the composition of the magnesia obtained being, by Scheibler's process:

	Per cent.
Silica, oxide of iron and alumina	1.47
Lime	2.18
Magnesia	95.99
Total	99.64

By Clonan's process:

	Per cent.
Silica, oxide of iron and alumina	1.05
Lime	1.94
Magnesia	95.00
Total	99.59

Bricks and other furnace-lining pieces may be made from the hydrate magnesia without any difficulty, the molded material firing without cracking or irregular shrinking. Converter bottoms so obtained are said to be remarkably homogeneous, hard and dense, and, while costing no more than those made of dolomite, are sensibly more durable.

The Products of the Combustion of Carbon at Different Temperatures.

The above subject was investigated some time since by Prof. A. Ledebur, the well-known German metallurgist, and a complete record of the experiments and results was published in *Stahl und Eisen* at the time. In a recent issue of the Excerpt Minutes of the Proceedings of the British Institution of Civil Engineers we find a condensed account relating to the subject, from which we extract the following:

When any carbonaceous fuel, whether solid or gaseous, is burnt, the combustion is said to be perfect when the gaseous products contain no further combustible constituents. This condition can only be attained when oxygen is present in excess, and the proportion of such excess required diminishes, as a rule, with the temperature of the fireplace. The preceding statement, generally recognized as accurate, has, in Professor Ledebur's opinion, given rise to another, which, though current in most text-books and journals, is perfectly incorrect—namely, that high temperatures, such as are produced by combustion with previously heated air, generally favor the production of carbonic acid, and that when carbon is burnt with cold air the product is mainly carbonic oxide. The first part of this conclusion—that concerning the formation of carbonic acid—is only true when oxygen is present in excess, while the second, which deals with the production of carbonic oxide, is entirely inaccurate.

The chemical action of carbon on oxygen being intensified by a high temperature, Professor Ledebur points out that when sufficient carbon is present to produce carbonic oxide, that gas will naturally be produced, as for the same volume of oxygen twice as much coal will be consumed as when the product is carbonic acid. This necessitates twice as much absorption of heat in the gasification of the carbon, and therefore for equal consumption of oxygen the heat developed, as compared with that when carbonic acid is produced, is as 3 : 5. The larger quantity of coal burnt develops the lesser amount of heat, and when, as a consequence of this or other causes, the temperature falls, a larger initial production of carbonic acid results, whereby heat is more rapidly developed. That the above are not merely unsupported theoretical deductions will be familiar to all who are accustomed to work gas generators, where the gases richest in carbonic oxide are produced with the hottest working. Thus Dr. Stockmann found, when the producers were working cold, 16.56 per cent. of carbonic oxide to 12.14 of carbonic acid; but with hotter working the proportions were 21.73 to 7.41 per cent. The same general result takes place in the hearth of a blast furnace; the higher the temperature of the blast the more completely do carbonic acid and free oxygen disappear at the tuyeres; were it otherwise, it would be impossible to account for the increased reduction of silicon and manganese by very hot blast, having regard to the energetic oxidizing action of carbonic acid at high temperatures. In blast furnaces smelting lead ores the conditions are different; carbonic oxide is not required as a reducing agent, and carbonic acid is no drawback, and, as a consequence of the lower temperature prevailing in such furnaces, carbonic acid is found in notable quantity immediately above the tuyeres. After discussing the extreme improbability of the indirect production of carbonic oxide by the reduction of previously-formed carbonic acid, Professor Ledebur describes some experiments upon the combustion of charcoal in air when heated to different temperatures. The apparatus consisted of the following parts: 1. A gas holder, containing the air. 2. A washing bottle, with potash liquor. 3. Chloride of calcium tube. 4. Combustion tube, containing 5 grams of wood charcoal previously heated to redness, arranged in a furnace. 5. A U-tube, with chloride of calcium. 6. Weighed potash apparatus No. 1. 7. Second combustion furnace containing a tube with oxide of copper. 8, 9. Chloride of calcium and potash tubes similar to Nos. 5 and 6. 10. Chloride of calcium safety-tube.

For heating the charcoal at temperatures below a cherry-red heat a glass combustion tube heated by gas was used, but for greater heats a porcelain tube and heating by a charcoal and coke fire, with a chimney draft, was necessary. The amount of air consumed in each experiment was approximately the same, namely, 1.1 liter, or 1.422 grams, containing 0.333 gram of oxygen, and the velocity of the current was kept constant by the head of water in the gas-holder. The experiments were carried out in the following manner: After removal of the potash apparatus, the oxide of copper in the second tube was heated to redness, the tube containing the charcoal brought to the temperature required, and air was allowed to pass through until the apparatus was filled with gas of uniform composition. The potash tubes were then introduced and allowed to remain until the required volume of air was expended, when they were taken out and weighed in the usual manner.

The increase in weight of the first potash tube gave the direct production of carbonic acid, and from that of the second the proportion of carbonic oxide was calculated. Furthermore, as the oxygen in the first case was derived entirely from the gas-holder, and that in the second to the extent of one-half, the comparison of the calculated quantities of oxygen with that of the air expended gave a sufficiently accurate idea of the amount of oxygen escaping combustion. The results of the experiments were as follows:

Oxygen used.				Coal burned.				Temperature of combustion.
Total.		Per cent.		Total.		Per cent.		
Burt	Escaping unburnt	For burnt	Escaping unburnt	To CO_2.	To CO.	To CO_2.	To CO.	
Gr.	Gr.			Gr.	Gr.			
0.076	0.255	33.0	77.0	0.085	0.007	81.4	18.6	Below melting zinc, about 350° C.
0.267	0.064	80.6	19.4	0.084	0.032	72.4	27.6	Melting zinc, about 440° C.
0.291	0.040	87.9	12.1	0.091	0.026	77.4	22.6	Dark-red heat, about 550° C.
0.166	0.065	80.3	19.7	0.077	0.046	62.6	37.4	Commencing cherry-red heat, about 700° C.
0.353	.....	100.0	.....	0.003	0.258	1.3	98.7	Yellow heat, about 1100° C.

Professor Ledebur then compared the results of these experiments with those obtained in practice in ordinary grate fires, blast furnaces and Bessemer converters, and shows them to be substantially in accordance.

Steel Castings for Government Work.

The recent appropriation by Congress to establish a board for the inspection of sites for foundries and the capabilities of our country to furnish steel guns has called out many articles on steel castings in the various trade journals, and these have been extensively copied by the press throughout the country. Most of the articles we have seen are devoted to the praise of the English or the French, ignoring the knowledge or skill of the American mechanic in steel castings; in fact, one would be led to believe that there are no steel castings made in this country, and that if any are used they are imported. So widely have the doings of our foreign brethren been heralded that this growing industry in our own country has been almost entirely overlooked. There is located in Pittsburgh, right in the heart of the iron and steel district, a company who make nothing but steel castings, who in a modest yet very thorough manner during the last 13 years have built up a trade which now extends from the Atlantic to the Pacific, from the Canadas to the Gulf, even including Mexico. We refer to the Pittsburgh Steel Casting Co., who have now one of the finest plants in this country, and we believe it is the largest works in the world given entirely to the manufacture of steel castings. Their works cover over 5½ acres, on which are erected over 65,130 square feet of buildings. They have erected there two large steel works, one devoted to the manufacture of crucible steel, and the other to Bessemer steel. In the crucible department are made steel castings varying in weight from 1 pound to 3 tons; in the Bessemer department large castings of almost any required weight can be produced. Their plant is entirely modern, best fire-proof brick, stone and iron alone entering into its construction, and everything is of the best. These works are under the management of Mr. William Hainsworth, who has shown much ability in arranging the plant so as to be both convenient and capable of being worked with as few men as possible. But what was desired to be noted especially in this article was the suitability of this plant for the manufacture of the Government work at the least cost to the Government, and of as good quality, if not better, than England or France can produce. This plant is specially fitted for this work; its geographical situation, too, could not be better. The mechanical adaptability of its Bessemer department to the work the Government has in view can be better appreciated by a partial description of their capacity and machinery.

The Bessemer department contains one converter which has blown over 6 tons, thus giving a converting capacity of 10 or 12 tons per hour. The iron is melted in cupolas built with a view of securing the best results. The converter is hung low, the trunnions on which it swings being on a level with the ground, thus saving many advantages to the blower, besides removing liability to loss of life in the casting pits. The steel is treated by processes peculiar to this company, insuring steel that will combine softness, strength, and wear and be practically free from porosity. It was our privilege the other day to witness the casting of a large pinion, the finished weight of which was 6 tons. The molds, having been prepared, were placed in a large pit excavated for the purpose, and to the naked eye nothing but an innocent opening was visible, the wonderful intricacies of the casting being hidden. The metal was charged into the converter and blown at one blow, under the immediate supervision of Mr. Hainsworth, and until the moment the contents of the converter were ready to be poured into the ladle scarcely a man was to be seen, but at that moment they appeared, each man in his place, and the contents of the converter were poured into a large ladle which was hung from one of a number of powerful steam cranes which are located conveniently throughout the works. They bear around a burden of 25 tons with the greatest ease and rapidity. The ladle was swung over the mold, and at a certain signal the perfect fitting stopper was withdrawn and the molten metal poured out. It required but four minutes to pour and the large casting was made. A few days afterward we again saw the finished pinion as it was loaded on the cars, and though we have seen many fine castings, we can honestly say we never saw a better or sounder one. Where the sinking head was cut off an ample opportunity was afforded to examine the molecular structure, and it was all that could be desired. At a very small expenditure on the part of the Government these works could be put in a position to make cast-steel guns weighing from 10 to 150 tons and load them on the cars. A word as to guns. There are nominally two classes; one known as the "built-up" gun, the other the simple cast gun. The "built-up" gun has within the last few years grown in favor in Europe, and many of our own Government officials, always ready to follow foreign ideas, are staunch supporters of this class of weapon. It must be admitted that it has some good points, but whether it is better than the cast gun is as yet an open question, and though many officers of our Government, as has been stated, favored the "built-up" gun, still the Ordnance Department, to which they belong, have not as yet committed themselves. Eminent men of large experience here believe that the cast gun is far superior to that built of forged rings. As is well known, the weakest part of every casting is the center. This weakness is due largely to the unequal cooling, the edge or outside cooling much faster than the center, thus causing all the contraction to culminate at the center and weaken the casting considerably. It is our opinion that a gun should be made of cast steel, with center cored by the Rodman or any other method, that would give good results, and thus give the steel an opportunity to cool at the same rate in the center as at the edge, insuring an equality in the contraction and shrinkage. We believe such guns would give tests superior to any "built-up" gun. At any rate, in such an important matter as this, the Government should give each a thorough, practical test. Doubtless such a works as that we have referred to above would be glad to furnish the necessary material, free of cost to the Government, if they would make such tests.

TRADE PUBLICATIONS.

Steel Castings.

The Pittsburgh Steel Casting Co., Pittsburgh, manufacturers of steel castings and rolled blooms and billets, have just favored us with an interesting little catalogue descriptive of their steel castings, &c. Those who are interested in this direction and who anticipate business connection with the company will find the pamphlet to contain much of importance. Perusing its pages we find that the company's crucible department having been insufficient to satisfy the demands for large castings the company have, within the last two years, built a new work—a Bessemer department—with a capacity of 180 tons per day, where, by methods and processes of their own, they make large steel castings of all descriptions, and are now prepared to fill orders for the largest class of work. They further state that in some instances the time required to make these castings is longer than in the crucible department, but the time will be furnished on application. Their aim is to bring the price of large steel castings so near that of iron as to warrant the replacing of large iron castings with steel. The concluding pages of the catalogue are devoted to testimonials from different sources, all testifying in favor of the good work turned out by the company.

Stamped Ware.

We are in receipt of a very neat catalogue, in terra-cotta-colored cover, issued by Messrs. Matthai, Ingram & Co., Baltimore, Md. The pamphlet is an illustrated catalogue and price list of patent pieced, japanned and stamped tinware, together with house-furnishing goods manufactured by the firm named. A view of the office and salesrooms of the company, and also a general view of the factory, preface the work. In the circular to the trade the manufacturers call attention to the patented features of their goods, their system of packing and nesting, which secures minimum rates of freight, and the general advantages which Baltimore possesses as a shipping point for the Southern and Western sections of the country. The illustrations throughout the book are excellent woodcuts, and present a very fine appearance. Among the novelties shown may be mentioned what is called the "Utility" measure, with a funnel attachment adapting it for convenient use in filling bottles and cans. In the section devoted to japanned ware a combination slop-jar is shown, which has some excellent features. When in use with the cover or shield open, there is presented a complete protection to the walls and carpets, as water can be poured into it in the most careless manner without danger of splashing or spilling. When closed it is odorless, and the dasher over which the waste water passes is entirely hidden from view, thereby keeping the decorations clean and attractive. Some very handsome designs in toilet sets, both in form and embellishment, are shown. In the latter part of the pamphlet there is shown a full line of tinners' trimmings, embracing almost everything that is required for use in the construction of ware in the shop. A section is devoted to planished ware, which contains a very full line of goods. Wire goods are also presented, after which are sections devoted to house-furnishing goods, ironware, granite ironware, oil stoves, ice-cream freezers, refrigerators, &c. Accompanying the illustrated catalogue is a net price list of plain and retinned stamped-ware.

Foot and Power Presses.

We have received from the Niagara Stamping and Tool Co., Buffalo, N. Y., an illustrated catalogue of their power and foot presses, dies and tools for working sheet metal and wire. The pamphlet also contains a list, with illustrations, of their fruit-can tools, tinners' tools, &c. We have noticed former editions of this catalogue, so that in its main features it is already somewhat familiar to our readers. The Niagara Stamping and Tool Co. are making a specialty of just those conveniences which facilitate the labor of tinners and metal workers, and those who are fitting up shops will find much in the advertising matter of this company that is of interest to them. The line of squaring shears made by this concern is among the best that is now before the public. Among them may be mentioned power shears cutting from 26 to 62 inches in length. Can-soldering machines, jacketed and seamless steam kettles and various devices used by packers in putting up fruit and vegetables are also shown in this catalogue. The agent of the company is Mr. William Hagan, with office at No. 9 Burling Slip, New York, through whose courtesy this copy has reached us.

Convict Labor in New York.

The New York State Bureau of Labor Statistics, established by an act passed last session, is now in operation. Mr. Charles F. Peck, the Commissioner appointed by the Governor, has very properly commenced his work by calling on the Superintendent of State Prisons for copies of all contracts now in existence for convict labor in the several prisons. His object is to ascertain what convict labor costs, in order to compare it with the wages of citizen labor. Superintendent Baker's report in answer to the call of the Commissioner shows that the average pay for the prison hands employed by the contractors is 50 cents per day. The largest contracts are the Perry & Co. stove contract at Sing Sing, which calls for the labor of not less than 900 convicts at 56 cents per day each; the shoe contracts at Auburn and Sing Sing, which pay at the rate of 62 and 63 cents per day for the work of 400 men, and the Plattsburg Co.'s Clinton Prison clothing contract, which calls for the labor of 450 convicts at 35 cents per day each. Then there are axle, horse-collar, hame and laundry contracts at from 40 to 63 cents. In calculating the value of the labor to the contractor, it must be remembered that very little of it is skilled labor. New men have to be taught the business from the foundation, although with long contracts and long-term men the contractors manage to get tolerably fair work out of their gangs. It is not pretended that convicts will work as steadily or with as good will as citizens. But to offset this the contractors save rent, and, to a great extent, salaries.

Through the action of the Legislature and Executive the question will be submitted to the people at the next election whether the State prison contract system shall remain as it is or shall be abolished or modified. If the voice of the State declares against the contract system, the next Legislature will be in a position to establish a new system.

What this will be is not yet known, but as a matter of fact, and without prejudice for or against the contract system, so far as individual interests are concerned, we do not believe any system can be devised which will do less injury to citizen labor than is done by contracts let after fair competition to responsible contractors. The State, with the public treasury as a bank, would be a competitor against which no private enterprise could stand.

BUFFALO PORTABLE FORGES AND HAND BLOWERS.

Warranted Superior to any other make, and Guaranteed to give Perfect Satisfaction.

For sale by all the leading Iron, Hardware and Machinery Dealers throughout the country.

BUFFALO FORGE COMPANY,

BUFFALO, N. Y.

Send for Complete Catalogue.

WITHEROW & GORDON,

Engineers & Contractors

PITTSBURGH, PA.

Agents for the

WHITWELL HOT BLAST STOVES.

OVER 600 IN USE.

The following parties either have them in use or under construction.

Cedar Point Iron Co., N. Y
Dunbar Furnace Co., Pa.
Crane Iron Co., Pa.
Pennsylvania Steel Co., Pa.
Neshannock Iron Co., Pa.
R. H. Coleman, Lebanon, Pa.
Chester Rolling Mill Co., Pa.
Davenport, Fairbairn & Co., Pa.
Isabella Furnace Co., Pa.
Paxton Furnaces, Pa.
Spearman Iron Co., Pa.
Etna Iron Works, Ohio.
Milton Coal and Iron Co., Ohio
Winona Furnace Co., Ohio.
Moss & Marshall, Ohio.
H. Campbell & Sons, Ohio.
Hocking Valley Iron Co., Ohio.
Cleveland Rolling Mill Co., Ohio.
Meier Iron Co., Ill.
North Chicago Steel Co., Ill.
Union Iron and Steel Co., Ill.
Means & Culbertson, Ky.
Ashland Furnace Co., Ky.
Norton Iron Co., Ky.
Southern States C. I. and S. Co., Tenn
Sewanee Furnace Co., Tenn.
James C. Warner, Rising Fawn, Ga.
Ohio Iron Co., Zanesville, O.
Sloss Furnace Co., Ala

WILLIAMS, WHITE & CO.,

MOLINE, ILLINOIS.

MANUFACTURERS OF

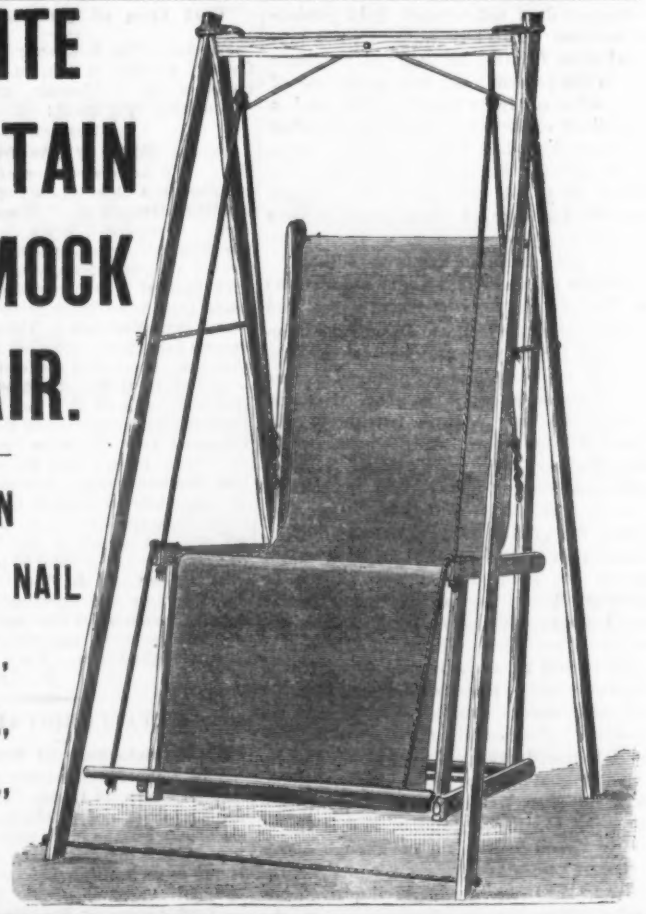
DROP HAMMERS,

HORIZONTAL PRESSES FOR BENDING IRON, GANG BORING MACHINES, TOOLS FOR PLOW MAKERS

THE JUSTICE HAMMER.

SEND FOR CIRCULARS.

WHITE MOUNTAIN HAMMOCK CHAIR.



LIVINGSTON HORSE NAIL CO.,

104 Reade St.,

New York, N. Y.,

GENERAL AGENTS.

HOSE REELS.

NO. 1 HOSE CARRIAGE.

This Carriage will easily carry seventy-five feet of ¾-inch 3-ply hose, and while one hundred feet can be reeled upon it, we recommend a larger size for that quantity. As shown in the engraving, it has fifty feet of heavy ¾-inch 3-ply hose upon the reel. It is finished in bright colors, stands up firmly, and occupies but little space.

PRICE, - - $2.45.

NO. 2 HOSE CARRIAGE.

The engraving shows a Carriage with 150 feet of heavy ¾-inch 3-ply hose wound upon the reel; 200 feet can be easily coiled upon it. It is light, compact, and convenient to hand. For shipping great distances, this size, in common with the others, can be packed in crates, not set up, and occupy the least possible space.

PRICE, - - $2.80.

NO. 3 HOSE CARRIAGE.

In the engraving, this Carriage is shown with 200 feet of heavy ¾-inch 3-ply hose upon the reel. On account of the elevated position of the reel, this Carriage is convenient to handle; the stooping position required by some patterns of hose carriages, or in coiling hose in the old-fashioned way, is avoided. The axle is of wrought iron and firmly set.

PRICE, - - $4.20.

LIBERAL DISCOUNTS TO THE TRADE.

MANUFACTURED BY

CARR & HOBSON, Limited,

Factory, Bergen Point, N. J. 47 Cliff Street, NEW YORK.

PENFIELD BLOCK CO.,

LOCKPORT, N. Y.

Trade Mark, "ANCHOR BRAND."

Chicago Railway Exposition, June, 1883,

BRONZE MEDAL

FOR THE

BEST PULLEY BLOCKS,

ALSO FOR THE

BEST BAGGAGE BARROW.

HENRY B. NEWHALL CO., 105 Chambers St., New York, & 47 Pearl St., Boston, (J. H. Work, Manager,) Eastern Agents.

S. H. & E. Y. MOORE, 163 & 165 Lake St, Chicago Agents.

Keystone Portable Forges.

Best in the Market. Strong Blast and Easily Worked.

Durable, and give entire satisfaction. All sizes for every kind of work. Also

Pressure Blowers

AND

Exhausters.

Send for Catalogue.

MANNING, MAXWELL & MOORE,

New York Agents, 111 Liberty St.

Keystone Portable Forge Co.,

204 North Fourth Street,

PHILADELPHIA, PA.

TRENTON LOCK & HARDWARE CO.

WORKS AND PRINCIPAL OFFICE:

TRENTON, N. J.

AGENCIES AND DEPOTS:

JAMES M. VANCE & CO.

211 Market St., Philadelphia.

JAMES MARSHALL,

48 Warren St., N. Y.

MANUFACTURERS OF LOCKS AND HARDWARE.

CHAMPION ONE-MAN SAW

WITH PATENT ADJUSTABLE ATTACHMENT. The only Saw that can be adjusted for either a One-Man or a Two-Man Saw. We make the following lengths, 3½, 4, 4½, 5 feet. Send for sample.

WHEELER, MADDEN & CLEMSON MFG. CO., Middletown N. Y.

Captain Ericsson's Latest Achievement.

Since the days of Ericsson's caloric motor, when the renowned inventor almost dared to hope that steam was superseded as an agency for the propulsion of ocean-going steamers, he has never climbed to such a hight of expectation as now, nor become so strongly grounded in confidence as when contemplating his favorite submarine engine known as the Destroyer. This craft, as she was seen some two or three years ago at Delamater's Iron Works, in this city, by a "too inquisitive" reporter of *The Iron Age*, appeared unpretentious enough. She was long and narrow, and in a general way not strikingly different from an ordinary iron boat in course of construction. She was very strongly fastened, however, and from the various subdivisions answering to "fore-and-aft" and "'tween-decks," it was obvious that every inch of space was to be carefully economized. The enthusiastic inventor, whose youthful fire had not in the least abated, allowed an interview at his residence and explained that the purpose of the invention was to construct an engine adapted to naval warfare which no enemy could withstand. Since that date there have been numerous alterations, affecting not only the speed of the vessel, as it passes scarcely observed through the water, but as concerns the proposed projectiles, their guidance and penetrating power. Experiments about to be made at the docks below Tompkinsville, Staten Island, under the direction of Mr. V. F. Lassoe, Mr. Ericsson hopes, will prove decisive. As seen at her station a few days ago she was an odd-looking craft. In her gun, which pointed out at the bow about 8 feet below the surface of the water, is a long steel cylinder. This is the projectile which in warfare would be supplied with a torpedo at the conical-shaped tip, to explode on striking the side of a ship.

In the experiments a net will be lowered into the sea to serve as a target to be fired at at distances of from 300 to 500 feet. On the bow of the little craft, which is almost submerged, are two wooden floats to support the net in the water. The projectiles are hollow, and made so that they will float. The tendency to rise is so carefully adjusted as not to interfere with the flight under the water or to destroy the aim. They are expected to come to the surface about 700 feet from the vessel, and they will pursue a perfectly horizontal course for 500 feet at least. They will travel the first 300 feet in three seconds or a little less. They weigh 1500 pounds each. In the experiments there will be no occasion to use the torpedoes. The object will be to test the distance of flight and the accuracy of aim. The experiments hitherto have been conducted in still water, and the firing off Sandy Hook will be the first deep-sea practice. The Destroyer has attained a speed of 17 knots an hour, and her fullest capacity has not been reached. Although her hull proper is almost entirely under water, she is seaworthy, for everything can be battened down and no water can get into her. Blowers ventilate the boat perfectly. All her working apparatus is below water, and it would be next to impossible to disable her in an engagement. If the iron house built on top of her and her smoke-stack were knocked off entirely it would make no difference. She would be as serviceable as ever. A steel plate 18 inches thick is set in front of the pilot's position to deflect balls if they should strike there. The pilot is entirely surrounded by ironwork, and looks out through a small hole on a level with his eyes to get his bearings. He can touch off the gun when he gets in exact range, and immediately back off to safety. There is a dummy plug at the opening in the boat where the projectile goes out. This is shot away with the projectile, and a valve closes over the hole to keep out the water. Only enough water to fill the gun can get in anyway, and this can be quickly pumped out by a steam syphon. So there is no danger from this source. There is no room to spare on the boat, but sufficient for the uses required. The Destroyer is the only craft that shoots a torpedo under water. The forthcoming experiments are looked forward to with much interest.

The Providence Tool Co.'s Turkish Contracts.

Judge Blatchford reserves his decision in the case of the Turkish Government against the Providence Tool Co. The suit grew out of contracts made in 1873 for rifles and sabers, and was brought to recover 50,000 rifles retained by the Tool Company, which the Turkish Government claims to have paid for. The Turkish Government claims that, under an agreement with the Constantinople agent of the Tool Company it paid about $200,000 at one time, with the understanding that the payment was to be an entire release and discharge of all that was then due or to be claimed from the Turkish Government. The Tool Company then went on to manufacture the remainder of the arms, and they were accepted and left in the hands of the company for shipment, but when the Turkish Government demanded the arms the company refused to deliver them.

On the part of the Tool Company it is claimed that the three contracts covered 600,000 arms, and that the Turkish Government was to provide a banker's credit in London in advance of the manufacture of the arms. The total price to be paid was $9,500,000, but to turn out the first gun the Tool Company had to expend about $1,500,000 for special machinery. The company claim that the Turkish Government violated all the stipulations of its contracts with reference to providing advanced bankers' credits; that thereby the Tool Company were compelled to carry, with their own resources, a large lot of completed guns, and continue to purchase and keep on hand large quantities of raw material to keep their workshops in operation, being unable to reduce their force of workmen, notwithstanding that their guns were not taken by the Turkish Government, because it was impossible to reduce their force without losing their skilled workmen and disorganizing their whole establishment. This failure to provide the credits, accompanied with the neglect to make payment for the guns, so strained the resources of the Tool Company that they were compelled to carry a debt of about $3,000,000; that when it became known that the Turkish Government was financially embarrassed and was failing to meet its engagements under the contracts, the Tool Company's credit suffered to such an extent that they were compelled to pay ruinous sums for money accommodation, and that finally they were obliged to suspend. Claims were made upon the Turkish Government for indemnity at the very beginning of the manufacture of the guns, and the justice of this demand has always been recognized by the Turkish officials.

Wm. K. Seaman and His Rail-Cambering Machine.

To correct a sensational report, widely telegraphed over the country, that the mental aberration of the late Wm. K. Seaman was caused by the failure of his cambering apparatus and the challenge of his claims to invention by Mr. Gustin, in a letter to *The Iron Age*, Mr. W. F. Mattes has written the following letter, which appears in the Scranton *Republican*:

SCRANTON, PA., July 10, 1883.

My attention was called last evening to a brutal article in the *Free Press* relative to the death of William K. Seaman. Ordinarily, anything published by that miserable sheet may well be considered beneath notice. But this time the attendant circumstances, the evident inspiration of the article, and the publication of an abstract by the New York *Tribune*, seem, in justice to my dead friend, to demand a reply.

The general charge is made that Seaman appropriated Gustin's ideas in the design of his rail-mill machinery, and "then coolly took the credit of the whole idea." He did nothing of the kind. He followed the Gustin arrangement in general, introduced many radical changes of detail, most of which have proved valuable, and claimed credit for his modifications and additions. In his descriptive paper before the American Society of Mechanical Engineers, the only description he ever prepared for publication, he distinctly gave Mr. Gustin the credit that belonged to him. That *The Iron Age* and and other papers reproducing a portion of this paper omitted any reference to Mr. Gustin, was no fault of Seaman. An examination of Gustin's patents proved that they were based upon details, and that the arrangement as a whole was not patentable. As Seaman had introduced other and valuable details, he considered himself as much entitled to patents as any body, and it is a fact, if the emphatic written opinion of an eminent patent attorney is worth anything, that Seaman's design can be used without infringing upon the other.

It is falsely charged that Seaman's arrangement throughout is a flat failure. The modifications needed were very few, very simple, were foreseen both by Mr. Seaman and Mr. Wolf, and were provided for in the design, and the latter, so far from being more complicated than Gustin's, is decidedly simpler. The truth is that Gustin's apparatus has made no end of trouble, mainly from the crudity of his designs, wherever worked to something like full capacity. It may do well enough in a mill like that of the Scranton Steel Co., where two little 4-ton converters are run single turn, but if that concern ever grows to the stature of a modern steel mill there will be music with the cambering apparatus. The delays in the mill, which were by no means so aggravated as charged, were almost wholly due to trouble with a friction clutch, which was built substantially from Gustin's drawings, but larger and heavier. As to the capacity of the mill, it is impossible to say how much is due to this machinery, and how much to the new rail-train engine, but between them a marked improvement has been made, and the statement that the officers of the company contemplated throwing out the whole apparatus is false.

The next false statement is that Seaman required "nearly two years to work out what an ordinary draftsman should do in as many months." The truth is that he finished the last drawing in almost precisely six months from time of starting, besides doing much routine work. Mr. Wehrum is as rapid at such work as any man I know of, but neither he nor any man living can work out a design of such magnitude, complete in all details, in two months. In point of fact, Mr. Wehrum had a twist at this job when employed by the Lackawanna Co., and was completely stumped by a problem which Seaman very successfully solved—viz., the adaptation of this system to two pairs of hot beds. That many exaggerations have crept into the various newspaper articles is natural enough, but they are harmless and should pass unnoticed.

Mr. Seaman was a very clear-headed, able young engineer. His relations with the Lackawanna Iron and Coal Co. were strictly honorable and satisfactory to its officers, and his many friends in the city resent this dastardly attack upon the poor boy's memory. The business reputation that needs to be bolstered up by such means must be in a bad way, and the man who can inspire, and the editor who will publish, such an article deserve the contempt of society. The deed is worthy of a Dukes. W. F. MATTES.

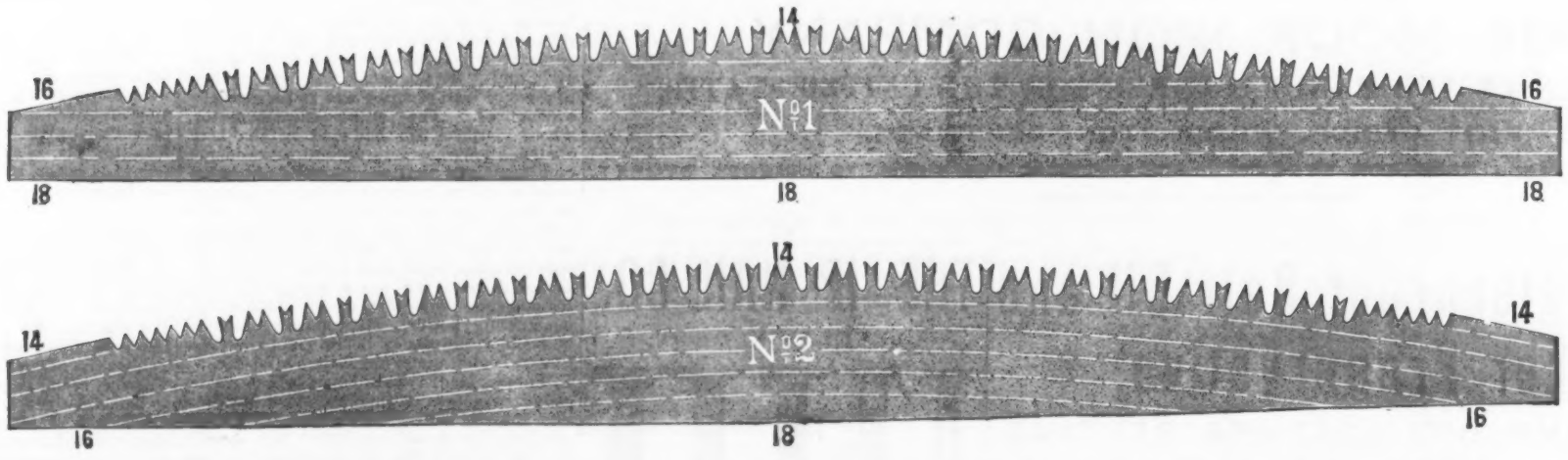
A hundred and seven Cornish mining companies, says a British contemporary, have been struck off the rolls of the Companies' Registration Office at Truro. These melancholy monuments of mining misfortunes had outlived their productiveness. Chili, Australia, the Cape, Spain and Venezuela did not, in the days when they were prosperous, send us copper, nor did the Straits and Australia supply us with tin. Most Cornish mines are, in fact, played out.

Nickel crucibles, instead of silver ones, are recommended by M. Mermet for use in chemical manipulations. Nickel, indeed, is slightly attacked by melted potash, but so is silver itself. Nickel crucibles cost at first much less than those made of silver, and, moreover, they have the great advantage of melting at a higher temperature. It often happens that inexperienced chemists melt their silver crucibles in heating them over a gas lamp; but such an accident is not to be feared in working with crucibles made of nickel.

THE "SIMONDS" SAW.

SOMETHING NEW IN CROSS-CUTS.

PATENTED DEC. 26, 1882.



Cross-cut saws have heretofore been ground in a straight line from end to end, as shown by broken lines in Fig. 1. As a result, a saw made 14 gauge thick at the center of the edge of the saw, and beveled to 18 gauge at the back, will be but 16 gauge thick at the edge near the end of the saw; or, in other words, **the teeth vary two gauges in thickness on the edge of saw,** as shown in diagram.

Our improvement consists in grinding the saw in crescent lines, parallel or substantially parallel to the cutting edge, as shown in Fig. 2, in which case **the edge or teeth are of even thickness,** while the inequality is thrown into the back, and the thickness of the saw remaining the same across its center as when ground the old way, **the ends are increased two gauges in thickness.**

The advantages derived from this method of manufacture are: 1st. The saw does not bind in the kerf as others, in consequence of being of even thickness throughout the cutting edge. 2d. It requires less set, for each tooth does an equal amount of work, and has equal thickness or strength to hold the set required for clearance. 3d. It will hold its set longer, as the wedge strain is taken away from the sides of the teeth. 4th. Being two gauges heavier at the ends, the strain of the saw is equalized throughout its length. 5th. The saw being stiffer at the ends, the operators can push as well as pull, without causing a curvature of the saw; consequently it does not vibrate, and cuts a smoother and narrower kerf. 6th. It requires less power to run it, for the reason that it cuts a narrower kerf and less timber, and also making an even in place of a varying kerf, it does not cut and recut at each passage of the saw, as is the case with others. 7th. It will not kink as easily as saws ground by the old method, as the taper from edge to back, being at right angles to a tangent of the cutting edge, serves as a brace to the saw.

By actual experiments in the Northwestern pineries, the "CRESCENT-GROUND SAWS" cut from 10 to 15 per cent. more timber than the straight-ground, and with much less labor, and in felling trees were especially advantageous.

Having adopted as a rule of our business to make but one grade of goods, viz., THE BEST, after August 1st, 1883, we shall cease making the Straight-Ground Cross-cut Saw, and produce only our Patented CRESCENT-GROUND, which is infinitely superior to the old style, and those who try them use no others.

Cadillac, Mich., April 12, 1883.

THE SIMONDS MFG. CO., Fitchburg, Mass.

Gentlemen: During the last year we have sold nearly three hundred of your *Crescent-Ground* Cross-cut Saws. We have sold them on an average of 85 cents per foot, and the parties who use them tell us they had rather pay this price, and even more, than to have the old-fashioned ground saw at 35 cents per foot. The most of our customers who are using them claim that your *Crescent-Ground* Saw will cut from 10 to 20 per cent. more timber (same labor being used) than any saw that they have ever used before.

Yours very truly, CUMMER & RAWLES.

Cadillac, Mich.

I consider the Simonds *Crescent-Ground* Saw as the very best saw in every particular that is in the market to-day. It is of better material, cuts easier, holds its point better, and lasts longer than any saw we have used, and it is not so liable to get sprung or break.

J. S. McDONALD, Foreman for McCoy & Co.

Camp of P. Hafley, Long Lake, Mich., Sept. 19, 1882.

THE SIMONDS MFG. CO., Fitchburg, Mass.

Gentlemen: We have tested your saws, and will freely say we think the Simonds *Crescent-Ground* is the best saw ever made, and that we have no use for any other kind.

J. McDONALD,
P. HAFLEY.

Camp of E. J. Capley, Round Lake, Mich., Sept. 20, 1882.

THE SIMONDS MFG. CO., Fitchburg, Mass.

Gentlemen: The *Crescent-Ground* Saws sent by you have been tested, and would say they are the finest cross-cuts I ever used, and think the mode of grinding a great invention.

Yours very truly, J. P. ALLEN.

Antigo, Wis., March 10, 1883.

SIMONDS MFG. CO., Fitchburg, Mass.

Gentlemen: The Simonds *Crescent-Ground* Cross cut Saws we sold gave most excellent satisfaction, and we shall be pleased to handle a goodly number next season. Some of our customers we have sold samples to, sent to your Chicago house and were supplied again from there.

Yours truly, KOHL & LEYKOM.

Duluth, Minn., April 3, 1883.

THE SIMONDS MFG. CO., Fitchburg, Mass.

Gentlemen: Last December we purchased of your agent a few of your *Crescent-Ground* Cross-cut Saws, and would say cheerfully that they *more* than filled the guarantee given us by you. We think they will cut 15 per cent. more logs (with the same labor used) than *any other* saw we know of or ever used, and next fall we will want more of the same kind.

Yours very truly, CUTLER, GILBERT & PEARSON.

Crooked Lake, Mich., Sept. 20, 1882.

THE SIMONDS MFG. CO., Fitchburg, Mass.

Gentlemen: The *Crescent-Ground* Saws have been thoroughly tested, and would say they are much superior to any brand of cross-cuts we ever had, and think they will cut 10 per cent. more timber than any other saw in America. Yours very truly,

P. JOHNSON, Foreman for Dewing & Son.

Cummer Lumber Co., Camp No. 4, Cadillac, Mich., April 13, 1883.

THE SIMONDS MFG. CO., Fitchburg, Mass.

Gentlemen: We have thoroughly tested the *Crescent-Ground* Cross cut Saws, and would say they work easier and cut faster than any other brand of saws we have used. During the last year we have tried five different manufacturers' brands of saws, and in our judgment your *Crescent-Ground* brand of Cross-cut Saws will cut 10 per cent. more than any of the five brands we speak of, and are not so liable to kink or spring as saws ground the old way, and they hold an edge a great deal longer. Yours very truly,

CUMMER LUMBER CO.,
W. W. CUMMER, President.

Crapo, Mich., Jan. 17, 1883.

MESSRS. SIMONDS, Fitchburg, Mass.

Have used the *Crescent-Ground* Cross-cut Saws for some months, and my experience with them shows that they exceed the percentage of gain guaranteed by your agent. We have been cutting the stock for our mill with three saws—two men to gang—where we formerly required four saws to cut the same supply. We are making an average of a million feet per month in my lumber output, from logs averaging nine to thousand. You may refer to me at any time. Respectfully, &c., L. P. SWIFT.

We manufacture five distinct lines of goods, viz.: Circular Saws, Crescent-Ground Cross-cut Saws, Straight-Ground Gang, Mill, Drag and Mulay Saws, Planing Machine Knives, and Paper-Cutting and Similar Knives, which we class as Special Knives. We claim for each line

A SUPERIORITY OVER ALL OTHERS.

For twenty years we have been engaged in a continued series of experiments to reduce the working of steel to a system, and in addition to the great variety of special tools which we have devised and have in use—covered by many patents—we have made several discoveries relating to the physical properties of steel—not known outside of our company—which insure to us a marked advantage in the quality and uniformity of the temper of our goods.

SIMONDS MANUFACTURING CO., Fitchburg, Mass.

BRANCH HOUSE AND FACTORY, COR. CANAL AND WASHINGTON STREETS, CHICAGO.

Dr. Siemens's Suit Against H. Sellers McKee.

On the 11th instant Dr. Charles F. Siemens filed a voluminous bill in equity against H. Sellers McKee, of Pittsburgh. The suit involves $1,000,000, and grows out of the failure of the Siemens-Anderson Steel Co. The bill states that on April 20, 1882, the plaintiff was, and yet is, the owner of 300 bonds of the defunct Steel Company, each of the par value of $1000, payable on April 1, 1911, with interest at the rate of 6 per cent. per annum, being part of an issue of 1000 of similar bonds valued at $1,000,000. The bonds were secured by a mortgage made by the Steel Company to the Farmers' Loan and Trust Co., of New York, in trust for the holders of the bonds. The property mortgaged consisted of the plant and real and personal property of the company. Of the 1000 bonds issued the Merchants' and Manufacturers' National Bank obtained 539, and 100 were never placed, but were retained by the company.

The United States Marshal on April 25, 1882, advertised certain property, including that described in the mortgage, for sale. There were doubts as to the effect of the sale upon the lien of the mortgage, and as to the title which would be acquired by the purchaser at the proposed sale, and with a view to the avoidance of litigation concerning the same the M. & M. Bank and the plaintiff on April 20, 1882, entered into an agreement for the purchase of the property for their joint benefit in proportion to their ownership in bonds of the Steel Co. The agreement provided that the bank should acquire title to the property for the benefit of itself and Siemens, and that, if within five months from the date of sale the bank should make to the plaintiff a reassignment and transfer of the license of Siemens to the Steel Co., the latter should surrender his right to the property and his $300,000 of bonds to the bank. The agreement further provided that in case the bank failed to make the reassignment Siemens should pay to it his portion of the cost of the property, or otherwise the agreement was to be null and void

The sale was stayed, and subsequently a portion of the property was again advertised to be sold on writs of execution issued out of the Common Pleas courts. This sale took place on June 5, 1882, but a few days prior thereto the plaintiff claims to have renewed the above agreement with McKee, who had since the 20th of April acquired the bonds held by the M. & M. Bank, and desired to purchase the property upon which the same was secured. The defendant, it is claimed, got possession of all the property except that located in the Fourteenth Ward, upon which the rotator furnaces were located. He also became the purchaser of the interest of the Steel Company in the Siemens letters patent, and it is alleged that he failed to make the reassignment of the license granted by plaintiff to the Steel Company, as agreed upon. The plaintiff claims to have carried out his part of the agreement by offering to pay the defendant the full proportion of the cost of the property. The M. & M. Bank were also notified of this fact.

The plaintiff now believes that McKee had, prior to receiving his (Siemens's) notice to pay his proportion of the cost, sold all the property acquired by him except the letters patent. He also believes that the purchase money received by defendant was in excess of the amount which he paid for the property and proper to be allowed him on the settlement of the account, and claims that there is nothing due by him to defendant under the agreement, but that, on the contrary, McKee is largely indebted to him. He holds that he fulfilled his part of the contract, which the defendant failed to do, and lays claim to the under license, the letters patent.

The Court is asked to decree that the defendant be compelled to make answer as to which of the Steel Company property he acquired title to, the price paid by him, together with all other disbursements made by him in that behalf, which of the property he has sold, to whom, the prices realized, and that he be directed to pay the plaintiff the proportion of the balance of receipts after deducting the expenditures.

NEW PUBLICATIONS.

STEAM NAVIGATION. A Chronological History of the Origin and Development of Steam Navigation. By George Henry Preble, Rear-Admiral United States Navy. 1543-1882. Philadelphia: L. R. Hamersly & Co. 1883.

Probably not many of the readers of this volume are aware that its author, who is now among the older officers of the navy, has for many years been in the habit of culling and collecting from the transient literature of the time, as well as from elaborate treatises, historical memoranda upon subjects connected with his profession. The present work may be considered as a garnering of his industrious gleanings from one particular field. It must be ranked rather as a valuable compilation of facts and statistics, enlivened with many interesting and suggestive incidents and anecdotes, than as a well-digested historical dissertation It is like an article in an encyclopedia filled out to the measure of a volume, without alteration in the manner of treatment, and with no effort to escape from the simple rut of chronological narration. Yet this method has great advantages in a book of reference, while the reader will be surprised to see how much interesting material has here been brought together. On the title page Admiral Preble places the dates "1543–1882." The mention of the former of these years is apparently intended to emphasize the fact that De Garey then employed paddle-wheels for propelling a vessel. This fact, however, has little significance, for such appliances were familiar at Rome under the Empire, and among other nations in times still more ancient. It is not the use of wheels instead of oars, but the introduction of steam as a motor, that is to be commemorated. Our author is inclined to give the honor of the latter invention, so far as concerns navigation, to Papin, who actually constructed and navigated a steamboat up the river Fulda in 1707. Passing by the interesting accounts of the experiments of Fitch, Symington, Fulton and others, we find the author quoting the statement of the London *Mechanics' Magazine* that "a vessel built by Captain Ericsson was probably the first practical screw propeller the world ever saw, and, in fine, the undivided honors of having built the first practical screw steamer, the first screw war-ship, and the first cupola (monitor) war vessel, belongs to Capt. John Ericsson. Watt's fame is, of course, world-wide." Admiral Preble says: "The original type of nearly all the engines used in steam navigation was the engine constructed at Soho by Watt & Bolton for Fulton, and first used by him upon the Hudson River. This had the beam below the piston-rod, as in the English boat engines, but the cylinder above deck, as in the American."

Rumsey's contributions to steam navigation are very interesting. He accuses Fitch of "coming pottering around" his Virginia work-bench and carrying off his ideas to be afterward developed in Philadelphia. In like manner, Captain Morey alleged that Fulton, by a breach of faith, imitated his model of a steamboat, but our author says that Morey must yield to Fitch the honor of being the inventor of the first successful steamboat constructed in this country. From this point the volume takes up all the early steamboats and the improvements in steam engineering in the order of their dates, describing each succinctly. The recalling of old, contemporaneous sketches of these successive wonders from the rusty files of newspapers, from the pages of dead magazines, from the alcoves of the literature of the first years of this century, produces a strange effect, but throws a light on the actual progress effected which no other method of treatment could secure. From the days of the Clermont, Fulton's first steamboat, in 1807, we pass to those of the New Orleans, which made the first trip from Pittsburgh to the city of her name; to those of the Clyde and Glasgow, in 1813; in short, to the introduction of the new motor sucessively on the Hudson, Delaware, Ohio, Mississippi, St. Lawrence, the Thames, the Rhine, and so gradually upon all the great rivers of the world. Admiral Preble calls Fulton's Demologos the first war steamboat. The Savannah, our first ocean steamship, dates back to 1819. Mr. Woodcroft styles this vessel a myth, and claims that the Rob Roy, a British steam packet, plying between Glasgow and Belfast, was the first sea-going steamer; but the American vessel really went from New York to Savannah in 1819, which was also the date of beginning the construction of the first steamer between New York and Havana.

Screw propellers now became desirable. Giving due credit to the original idea of Bushnell, in 1784, our author mentions the successive inventions of Delangue, Perkins, Woodcroft, Patten, Copley, Pettier, Gerard and others, and so passes to the Francis P. Ogden, Erricsson's first practical screw steamer, which dates from 1836. It need hardly be said that the Princeton, the work of the same engineer, was the first screw war vessel ever constructed. To Junius Smith is assigned the honor of establishing ocean steam navigation, between 1832 and 1838, and in the latter year the arrival of the City of Kingston, the Sirius and the Great Western in New York within a few days of each other, made it plain that the regular and stated steam navigation of the Atlantic was an accomplished fact. Very likely there are people still living who took passage on these pioneer vessels in their return voyages to the British Isles, and a flood of recollection would be stirred in them by perusing the advertisements which Admiral Preble quotes from the *Courier and Enquirer* of that day. One of these advertisements states that "the new and powerful steamship Sirius, 700 tons burden, and 320 horse-power, Lieut. R. Roberts, commander, is intended to sail from London, March 28, touching at Cork on the 2d of April, for this port, returning from New York to London on the 1st of May," and that "cabin passage is $140, including provisions and wines, and second cabin $80, including provisions." The Sirius, in fact, left Cork the evening of the 4th and arrived the evening of the 22d, making the passage in 18 days. The following day, April 23, 1838, was memorable in the history of New York, for when the population had thronged the wharves to see the Sirius, a second marvel was presented in the Great Western, which was descried steaming up the harbor, only 16 days from Bristol.

We have referred to the picturesqueness which Admiral Preble has been able to weave around a subject which at first does not seem to lend itself to such treatment, by his reproduction of contemporaneous news and comments. On the other hand, this scrap-book method is occasionally confusing as to facts and figures, because the same ground is traversed by varying accounts. Yet we know not where to find a volume containing an equal wealth of statistical and historical information on its subject. To add to its practical value the author subjoins a bibliography and tables showing the steam tonnage of all nations, the designating marks of steamships, the different ocean lines existing at various periods, the records of disasters and of quickest passages, the size and power of vessels, and many other details of like character. Few, if any, vessels which can be properly considered as types or pioneers, or as marking an era in the progress of steam navigation, fail to receive detailed mention or description here. But so steady and rapid is the progress made in steam navigation that, since the printing of Admiral Preble's book, ocean-going steamers have been planned that will exceed in speed and other desirable qualities the newest and greatest recorded by him. There must be limits, of course, to the possible achievements of steam, but before these shall have been reached some new motor, like electricity, may come forward to revolutionize navigation in its turn.

Mr. Henry E. Colton, lately removed, for partisan reasons, from the position of State Geologist of Tennessee, has been elected to the general management of the Rock City Real Estate Association, made vacant by the resignation of Col. J. B. Killebrew, who goes to Mexico. This company is composed of some of the leading citizens of the State. Mr. Colton, though not now in the employ of the State, will continue his efforts to bring to notice the neglected wealth of the South.

Steel Castings in Ship and Marine Engine Construction.*

BY WILLIAM PARKER.

(Continued from page 26, July 12.)

Having laid this matter before the Institute, I venture to hope that it will be well discussed in all its bearings, and I also hope that this paper will be followed by others giving the results of the experience obtained under various conditions, as with such further knowledge we shall obtain that confidence which is necessary for the full employment of this material. Table I contains the results of percussive tests made upon bars 1¼ inches square, resting upon supports 6 inches apart, and subjected to blows in the center from a tup weighing 10 cwt., falling through a hight of 7 inches. Table II shows the results of transverse tests made at University College, London, by Prof. A. B. W. Kennedy, on bars of about 1¼ inches square, supported on knife-edges 6 inches apart; load applied steadily upon a central bearing of 1¾ inches radius until the angle bent through reached 90°, when the radius was reduced to ⅞ inch. Table III sets forth the results of tensile tests, also made at University College by Professor Kennedy. Table IV contains the results of torsional tests, likewise made by Professor Kennedy. Table V shows the results of tests made by James Neilson, at Mossend, to ascertain the effects of various amounts of rolling and hammering upon the strength and ductility of steel plates. It will be observed, on inspection of the tables, that the ultimate strengths of the cast steel specimens in every case exceeded those of the wrought iron, while the extensions in 2-inch lengths average about the same in both cases. With regard to the forged steel, the tensile strength is 23 tons per square inch in the case of the shaft made by Messrs. Vickers, Sons & Co., and between 26 and 27 tons per square inch in the cases of the forged steel bolts made by Messrs. Jessop & Sons, the extensions being 46.8 and 37.5 per cent. If we consider that an approximate measure of the value of a material to resist repeated shocks is given by the product of its ultimate strength and its ultimate elongations, this being roughly proportional to the mechanical work necessary to break a specimen of the material, we find that on an average the cast steel gives a result fully one-third greater than the wrought iron, while the lowest result in the case of cast steel is nearly three times as great as that of the lowest in wrought iron. The forged steel, however, in all cases gives a result fully three times as great as that obtained in the case of the wrought iron. If we compare the results of the transverse tests on the different materials, we see that in the cases where the loads were applied steadily, two of the pieces of cast steel tested were broken and two not broken; all four pieces of wrought iron broke, but neither of the pieces of forged steel fractured. The loads producing bending in cast steel in all cases exceeded those in wrought iron, while the angles through which the pieces bent before fracture show greatly to the advantage of the cast steel, either by taking the average or by comparing the worst in each case. In comparing the transverse tests made by dropping heavy weights upon the specimens, we find that in forged steel three pieces withstood 23, 19 and 23 blows respectively without fracture, and two were fractured on receiving 16 and 17 blows respectively; while in the case of wrought iron fracture was produced by 12, 1, 4 and 4 blows, and in cast steel by 13, 9 and 19 blows respectively. The results of the torsion tests also, given in Table IV, show that the ultimate strength of the cast steel, and also the ductility, are greater than that of wrought iron, whether we compare the averages or the lowest test of each material, while the wrought steel again, especially in ductility, shows a superiority over either of the other metals. The test-pieces were in every case made as long as it was possible to make them without risk of using parts of the material injured by previous experiments, and the extensions were noted on the greatest length obtainable; but, as a means of comparison, they were also noted on a length of 2 inches in every case except two, in which the specimens were too short to allow of this.

In view of the importance of knowing the influence of working upon the strength and ductility of steel, Mr. James Neilson, of

TABLE I.

Results of Percussive Tests Made Upon Bars 1¼ Inches Square, Resting Upon Supports 6 Inches Apart, and Subjected to Blows in the Center From a Tup Weighing 10 cwt., Falling Through a Hight of 7 Inches.

Description of Material.	Mark on test-piece.	Number of blows given.	Angle through which bent.	Remarks.
Wrought iron.	H.B.	1	2°	Cut from wrought-iron crank-shaft forwarded by J. Spencer & Sons.
Do.	H.C.	12	138°	
Do.	C.	4	50°	Cut from wrought-iron crank-shaft made by the Thames Iron Works Co.
Do.	L.	4	49°	
Cast steel.	S.2	13	114°	
Do.	S.72	9	77°	
Do.	C.2	19	167°	
Do.	R.	.....	195°	This piece was 1 inch square and was bent under steam hammer. Not broken.
Forged steel.	F.	23	198°	Not broken.
Do.	W.P.3	23	198°	From crank-shaft of s. s. City of Berlin. Test-pieces not broken.
Do.	W.P.4	19	198°	
Do.	B.I.	16	96°	From broken screw-shaft of s. s. Faraday.
Do.	B.	17	112°	

TABLE II.

Results of Transverse Tests made at University College, London, by Prof. A. B. W. Kennedy, on Bars of about 1¼ Inches Square, Supported on Knife Edges 6 Inches Apart. Load Applied Steadily upon a Central Bearing of 1¾ Inches Radius Until the Angle Bent Through Reached 90°, when the Radius was Reduced to ⅞ Inch.

Test No.	Description of material.	Mark on piece.	Dimensions of test piece.		Load at center of span.					Angle through which finally bent.	Remarks.
			Depth.	Breadth	At limit of elasticity.		At break.		At limit reduced to 1¼ sq.		
			Inches.	Inches.	Lbs.	Tons.	Lbs.	Tons.	Tons.	Degrees.	
2565	Wrought iron.	H.B.	1.25	1.246	7,570	3.38	15,120	6.75	3.39	19	Fracture square across, laminated and soft looking, with a few very large crystalline facets. A number of cindery cavities.
2564	"	H.C.	1.243	1.240	7,440	3.32	21,770	9.72	3.38	48	Very largely crystalline and somewhat laminated.
2630	"	C.	1.263	1.260	7,805	3.48	.....	.....	3.38	94	Fracture: Tension side. Silky laminated. Compn. side. Irreg. crystals, large facets.
2631	"	L.	1.252	1.252	8,720	3.89	.....	.....	3.88	104	Fracture: Tension side. Silky laminated. Compn. side. Coarsely crystalline.
2561	Cast steel.	S.1.	1.264	1.234	8,760	3.91	34,480	15.39	3.87	66	Largely crystalline throughout.
2562	"	S.72.	1.332	1.250	12,320	5.50	.....	.....	4.85	110	Not broken; slightly cracked at one edge.
2632	"	C.2.	1.276	1.270	10,350	4.62	Approximate 26,960	12.03	4.38	40	Crystalline throughout, with large facets.
2658	"	R.	1.017	0.996	5,740	2.56	.....	.....	4.38	142	Unbroken; slightly cracked at edges.
2633	Forged steel.	F.	1.261	1.261	11,150	4.98	.....	.....	4.85	164	Unbroken.
2563	"	B.2.	1.260	1.250	16,550	7.39	. .	.....	7.27	149	Unbroken.

TABLE III.

Results of Tensile Tests made at University College, London, by Prof. A. B. W. Kennedy.

U.C.L. Test No.	Description of material.	Mark on piece.	Dimensions of test-piece.		Limit of elasticity per sq. in.		Breaking load per sq. in.		Ratio of limit to break.	Extension on maximum length, p.c.	Extension on length of 2 in. p.c.	Reduc. of area, p.c.	Remarks.
			Diameter.	Area.	Lbs.	Tons.	Lbs.	Tons.					
			Inch.	Sq. in.						On 3 inch length.			
2732	Cast steel from plate ingot.	S.2	0.750	0.442	36,040	16.09	50,810	22.68	0.709	6.7	9.0	9.3	Irregular, crystalline with granulation.
2733	Cast steel from J. Spencer & Son.	S.72	0.750	0.442	34,000	15.18	53,160	23.73	0.640	on 2 in. 31.5	31.5	42.3	Granular, and silky specked with crystal
2740	Cast crucible steel from Jessop & Sons	C.2	0.750	0.442	....	....	53,900	24.06	....	on 1 in. 10.4	....	11.9	Coarsely crystalline granular throughout.
2800	Ditto ditto	J.	0.760	0.454	40,530	18.09	63,020	28.13	0.643	on 1½ in 10.7	....	16.5	Irregular, silvery, granular specked with crystals.
2803	Cast steel from Steel Co. of Scotland.	R.2	0.749	0.441	34,380	15.35	63,190	28.21	0.544	on 3 in. 10.0	12.5	13.2	Finely crystalline, a small trace of granulation. Irregularly extended on surface.
2804	Ditto ditto	R.3	0.750	0.442	34,700	15.49	64,730	28.90	0.536	on 3½ in 16.6	19.0	19.0	Finely crystalline, 25 per cent. Granular. Irregularly extended on surface.
2734	Wrought iron from crank-shaft.	H.B.	0.750	0.442	29,870	13.33	31,780	14.18	0.940	on 3 in. 4.0	5.0	5.0	Very irregular, and without "fiber," welding generally bad, traces of crystal.
2735	Ditto ditto	H.C.	0.750	0.442	....	....	34,040	15.20	....	on 2½ in 6.8	10.0	8.4	One-half of fracture a totally bad weld.
2738	Wrought iron from shaft by Thames Iron-works.	C.	0.750	0.442	34,410	15.36	44,990	20.08	0.765	on 4 in. 17.5	21.0	19.0	Silky granular, with little sign of lamination, but "fiber" short.
2739	Ditto ditto	L.	0.750	0.442	28,430	12.69	44,310	19.78	0.641	on 4 in. 21.7	29.0	26.9	Silky granular, a defective weld extending apparently all along piece across one diameter.
2741	Forg'd crucible steel from J. Jessop & Sons	F.	0.748	0.439	41,780	18.65	59,940	26.76	0.697	on 2½ in 32 0	37.5	64.7	Silky, and partly granular.
2736	Forged steel from shaft of s. s. Faraday	A.B.3	0.748	0.439	49,060	21.90	79,040	35.28	0.621	on 3½ in 25.7	33.5	45.9	Finely granular, and silky specked with fine crystal.
2737	Ditto ditto	A.B.4	0.748	0.439	49,090	21.91	79,850	35.65	0.615	on 3½ in 20.9	26.2	43.7	Finely granular, closely specked with crystal.

Mossend, was kind enough to have some experiments made upon pieces cut from the same ingot, and hammered or rolled down by different amounts. The results of these tests are given in Table V. These tests show that, while the cast steel, as cut from the ingot, has a strength of 23.6 tons per square inch, and a ductility represented by an elongation of 10 per cent. in a length of 8 inches, hammering it until its section is one-fourth of the original increases the strength to 32.1 tons, and the elongation to 11 per cent.—an increase of 36 and 10 per cent. respectively, while rolling it until its section is reduced to one-fifth of the original increased the strength to 30.6 tons and the elongation to 23 per cent., an increase of 30 and 130 per cent. respectively. Ordinary plates rolled from the same charge to ⅞ thick were found to have a tensile strength of about 27 tons per square inch, with an elongation of 26 per cent. in a length of 8 inches. The other experiments, in which plates were reduced to ½ inch from thicknesses of ingot varying from 15 inches to 1 inch, show very little difference as regards tensile strength, but the ductility is greater in the cases in which the most work is put upon the material. The experiments, also, in which plates were worked down from various thicknesses of ingot slabs to ¼ inch thick give similar results, both as regards strength and ductility. While the different amount of work in rolling the plates from various thicknesses to either ½ inch or ¼ inch does not appear to have a marked influence upon the tensile strength, the operation of rolling from ½ inch to ¼ inch appears to have a great influence, increasing the strength in every case from about 26 to 29 tons per square inch. This would appear to be principally due to the fact that the latter rolling is necessarily performed at the comparatively low temperature, the thin plates losing their heat so much more rapidly than thicker ones.

I would here state the nature of the tests which have been applied by the surveyors of Lloyd's Register to cast-steel structures which came before them for approval. In the case of crank-shafts and other engine work, test-pieces have been cut for tensile and cross-bending tests either from portions which have had to be mac ined o:t, or from portions specially cast on for testing purposes, or from the heads of the casting. In cases of stern-frames and rudders and other large castings in which such tests are practicable, in addition to the tensile and cross-bending tests of pieces cut from the casting, they have been subjected to drop and percussion tests as follows: Frames are hoisted to an angle of about 45°, and allowed to fall on a hard floor. Rudders are hoisted to a hight of 10 or 12 feet and let fall upon a flat floor. Subsequently they are hammered all over. Tiller quadrants are also subject to percussive tests, and these tests appear to show that cast steel may be made quite as reliable, even if not more so, than wrought iron for forgings; but the forged steel surpasses in ductility anything that has been attained in castings, and, notwithstanding the opinion of M. Pourcel, I think that it will never be possible to entirely obtain from castings, by any chemical process whatever, such results as are obtainable by mechanical forging. With regard to the quality of steel for cast crank-shafts and other engine work, the committee of Lloyd's Register consider that the tensile strength should not exceed 30 tons per square inch, and that a piece cut 1¼ inches square should be capable of bending cold through an angle of 90° over a radius not greater than 1¼ inches. It is possible that steel of greater hardness than this would be sufficiently ductile for many purposes, and with greater experience it will perhaps be found advisable to modify these tests, but more experience is now required in order to give greater confidence in the material.

TABLE IV.

Results of Torsional Tests Made at University College, London, by Prof. A. B. W. Kennedy.

U. C. L. Test No.	Description of material.	Mark on piece.	Dimensions of test-piece. Diameter, inches.	Dimensions of test-piece. Length betw'n shoulders, inches.	Twisting moment, inch-pounds. At limit of elasticity.	Twisting moment, inch-pounds. At maximum.	Ratio of limit to maximum.	Ultimate twist (No. of turns in length of 10 inches.)	Remarks. ["Ultimate twist" is that of piece between dots on parallel part, and does not include "twist of shoulders."]
2719..	Cast steel from plate ingot	S.1	0.625	2.70	.....	3,168	.....	5.2	Silky fracture; surface much distressed and twisted.
2720..	Cast steel from J. Spencer & Sons	S.72	0.625	0.86	.....	3,972	.....	10.7	Silvery fracture; surface twisted, but regular,
2721..	Cast steel from J. Spencer & Sons	S.72	0.625	3.31	.....	3,756	.....	11.3	Silvery fracture; surface twisted, but regular.
2728..	Cast crucible steel from J. Jessop & Sons	C.2	0.625	3.30	.....	2,550	.....	2.2	Irregular silvery; a small flaw in fracture; surface flawed and distressed.
2801..	Cast crucible steel from J. Jessop & Sons	J.	0.635	6.00	1,200	2,940	0.400	1.8	Silvery irregular; a flaw in fracture; flaws on surface.
2805..	Cast steel from Steel Company of Scotland	R.1	0.625	5.13	960	3,516	0.273	5.0	Silvery, slight lamination showing on surface; twisted, but regular.
2722..	Wrought iron from crank-shaft	H.B.	0.625	0.96	.....	1,884	.....	0.8	Granular and cindery; some cracks on surface, and distressed.
2723..	Wrought iron from crank-shaft	H.C.	0.625	5.20	660	2,520	0.262	4.9	Silky laminated; much distressed and twisted on surface.
2726..	Wrought iron from shaft by Thames Iron Works	C.	0.625	2.40	.....	2,040	.....	2.5	Silky; a bad flaw, with cinder in weld; distressed on surface.
2727..	Wrought iron from shaft by Thames Iron Works	L.	0.625	2.22	.....	2,820	.....	10.0	Silky; somewhat distressed and twisted.
2729..	Forged crucible steel from J. Jessop & Sons	F.	0.625	about 1.3	.....	2,588	....	10.0	Irregular silvery; twisted, but very regular surface.
2724..	Forged steel from shaft of s. s. City of Berlin	W.P.1	0.625	3.65	.....	3,432	.....	12.8	Silvery; twisted, but fairly regular.
2725..	Forged steel from shaft of s. s. City of Berlin	W.P.2	0.625	1.11	.....	3,540	.....	11.5	Silvery; twisted, but fairly regular.
2730..	Forged steel from shaft of s. s. Faraday	B.1	0.625	7.05	1,200	4,108	0.291	4.6	Silvery, with a trace of crystal; surface twisted, but regular.
2731..	Forged steel from shaft of s. s. Faraday	B.2	0.625	7.04	1,380	4,199	0.329	5.1	Silvery; surface as 2730.

Adjustable Sieves.—All who have occasion to employ sieves for different purposes are aware of the necessity of using those with different meshes in order to accomplish the sorting of grain, seeds and other materials in the most satisfactory manner. The idea of a sieve so constructed that the mesh can be changed at will, without the necessity of removing the material from it, is one that must commend itself to all who have occasion to use such an article. The Milton Sieve Co., Limited, Milton, Pa., are manufacturing an article of this kind. Instead of having a round form, as is customary with many kinds of sieves, this has a square or rectangular rim, and the change in the mesh is caused by jointed corners of the rim, by which it can be compressed so as to be diamond or lozenge shape, instead of square. Of course, each intersection of the wires forming the mesh of the sieve is correspondingly affected, and therefore the mesh is changed in a proportionate degree by changing the shape of the sieve. One corner of the sieve is provided with a segmental shaped gauge, by which the sieve can be held in any desired position, or, in other words, the mesh maintained of any desired size. The manufacturers state that sieves of this kind will separate rye from wheat, and clean grain from cockle and all foreign seeds. The statement is also made that they will clean clover seed from the various weeds with which it may be mixed. It is especially desirable for cleaning garden seeds.

TABLE V.

Tests made by Mr. James Neilson, at Mossend, to Ascertain the Effects of Various Amounts of Rolling and Hammering upon the Strength and Ductility of Steel Plates.

The following pieces were all cut from one ingot:	Dimensions of test-piece. Breadth.	Thickness.	Area.	Breaking strains. Tons.	Tons per sq. in.	Elongat'n in 8 inches.
	Inches.	Inches.	Sq. inches			Per cent.
Piece 15 inches thick, hammered to 5 inches and then rolled to ½ inch	1.41	.5	.705	18.3	25.9	27.0
" 12½ " " " " " ½ "	1.40	.51	.714	18.9	26.4	27.0
" 10 " " " " " ½ "	1.26	.49	.617	16.4	26.5	26.0
" 7½ " " " " " ½ "	1.27	.50	.635	16.65	26.2	24.0
" 5 " rolled without hammering to ½ inch	1.27	.48	.609	16.05	26.3	22.0
" 5 " " " " ½ inch	1.42	.45	.639	16.7	26.1	24.0
" 3 " " " " ½ inch	1.37	.50	.685	17.4	25.4	25.5
" 2 " " " " ½ inch	1.39	.53	.736	19.2	26.0	26.0
" 1 " " " " ½ inch	1.39	.48	.667	17.25	25.8	26.0
" cut lengthwise direct from ingot	1.38	.50	.690	15.2	22.0	9.0
" 15 inches thick, hammered to 5 inches and then rolled to ¼ inch	1.29	.25	.322	9.1	28.2	24.5
" 12½ " " " " " ¼ "	1.29	.255	.326	9.5	29.1	22.5
" 10 " " " " " ¼ "	1.31	.25	.327	9.4	28.2	22.0
" 7½ " " " " " ¼ "	1 26	.24	.302	9.0	29.7	16.0

	Size of test-piece. Breadth.	Thickness.	Area.	Breaking strains. Tons.	Tons per sq. in.	Elongation.
	Inches.	Inches.	Sq. inches			Per cent.
Piece cut direct from ingot	.96	.995	.955	22.6	23.6	10
Same piece after testing, hammered to ½ inch	.55	.55	.302	9.7	32.1	11
Ordinary plates from same charge	1.39	.81	1.125	31.4	27.2	25
	1.39	.82	1.139	31.2	26.6	27
Piece 1¼ inch cut from ingot and rolled to ⅝ inch round	.55 diameter		.237	7.25	30.6	23

SCIENTIFIC AND TECHNICAL.

Glass Blowing by Compressed Air.

According to *Engineering*, the first in France to employ compressed air for glass blowing was probably a workman named Baccarat, who, in 1824, invented a small mechanical blower. A process which has been in use at the Clichy Glass Works of M. M. Appert, of Paris, since 1879, also dispenses with mouth blowing. Appert's apparatus is capable of blowing the largest pieces of glass, and it is extremely valuable from a humane point of view, as it prevents those maladies of the glass blower which arise from forced expiration and breathing hot, dry air. The apparatus, as described to the French Academy of Sciences, consists of two conjugate compressors put in action by the shafting of the works, and storing compressed air in reservoirs sufficient to serve 12 hours. It is distributed to the blowing apparatus by pipes with cocks, and controlled by a pressure regulator. In the Clichy Works the air is employed under three pressures, one of 42 pounds per square inch, one of 14 pounds per square inch, and one of 2.85 pounds per square inch. The last believing that the wire conducts heat to the ice from the atmosphere, and that the experiment does not illustrate the well-known fact that increased pressure lowers the freezing point. A silk wire, weighted to the same amount as a metallic wire, will not cut through a block of ice.

Determination of the Temperature of Furnaces.

The method adopted by the Paris Gas Co. for ascertaining the temperatures of retorts and settings is described as follows: The appliances consist of a covered wooden pail holding 10 liters. The lid of this pail is pierced with a hole, and fitted with a thermometer with scale projecting above the surface. A cube of iron weighing 2 kg., and a long iron pricker for moving the same, complete the list of articles used. For taking temperatures of flues, retorts, &c., the block of iron is placed in the indicated position, and left there until it becomes of the same degree of heat. The block is provided with a hole for the insertion of the pricker, and by this means, when the temperature of a chimney-shaft is required, the iron is simply held at the desired hight while the rod passes through the hole in the brickwork. While this is going on the pail is placed on the level ground—a condition facilitated by the fact that at the 10-liter water-line there are three equidistant spill holes in its sides. Water is poured in until it overflows at these points, which are then closed. The cover fitted with the thermometer is then placed in position, and briskly spun round three or four times. In this way the intial temperature of the water may be read off. The block of iron, which should have been at least 25 minutes in the heat, is then quickly drawn out and dropped into the water in the pail—an operation which should only require two or three seconds to execute. The cover is then turned anew, and the highest temperature of the water is read of. This concludes the experiment. Tables are compiled for use with the appliance, and these give the required temperature of the iron corresponding to the observed elevation of the temperature of the water. The thermometer employed registers to the fourth of a degree Centigrade.

Arrangement for Registering the Speed of Trains Passing Over Bridges.

Mr. D. B. Kagenaar, of the University of Utrecht, recently devised a novel arrangement for registering the speed of trains while passing over bridges. It consists of two parts. At each end of the bridge is fixed a pedal, placed against the rail so as to be depressed by each wheel of the train passing over the spot. Each depression of the pedal makes contact in an electro-magnetic circuit, which, in part 2, acts on needles placed against a cylinder situated at any convenient distance. This cylinder is made to revolve by clockwork, at a uniform speed, and is covered with a sheet of paper. While no wheels pass the pedals on the bridge the needles mark straight parallel lines on the revolving paper sheet; but if contact is made as above mentioned, the respective needles are momentarily deflected, and mark the instant at which each wheel passes the pedal in connection on the bridge. The distance apart of the pedals at each end of the bridge being known, as also the rate at which the registering cylinder revolves, the speed of the passing train can be deduced by simple measurement of the distance apart of the traces made by the marking needles. As a further check, the number of axles of which the train is composed is marked at the same time, and in the same way, by the needles deflecting at each contact in the circuit.

A New Method for the Determination of Nitrogen.

A new method for determining nitrogen, applicable to all nitrogen compounds, is proposed by H. Grouven. It consists essentially in burning the substance at a bright-red heat in a current of superheated steam. He first applied the process on the large scale to the production of ammonium salts from peat, but has since perfected it as an analytical method. The substance is burned in a boat, and the vapors arising from it are passed over a glowing layer of small fragments of a preparation called by the author "contact-mass," and then through standard acid, as in the soda-lime method. The contact-mass consists of an ignited mixture of peat, chalk and cement clay in certain proportions, and must be renewed after about 50 combustions. The advantages claimed for the method are that combustions may succeed each other rapidly in the same apparatus (constructed of iron, with asbestos stoppers), that large materials (two to three grams) may be used, that no drying or pulverization is necessary, and that it may be combined with an ash determination. Nitrates are dissolved with addition of sugar, sufficient clay is added to make a stiff dough, and the latter is introduced into the apparatus. The method is said to give concordant results, which are slightly higher than those obtained by the soda-lime method.

The Pressure of Dry Sand.

In a paper published in the *Zeitschrift des Oesterreichischen Ingenieur und Architekten-Vereins*, an abstract of which is given in the Excerpt Minutes of the Proceedings of the British Institution of Civil Engineers, Mr. Forchheimer, of Rachen, Germany, describes experiments made by him with the object of determining the pressure exerted by dry sand on retaining surfaces under various conditions, and the motion and form taken by it when collapse occurs. He also investigates the phenomena theoretically, making the simplifications of his general formulæ justified by the experimental results. The first series of experiments undertaken aimed at ascertaining the pressure exerted on the bottom of a vessel in which sand is piled up to various hights, and the form assumed by it on collapse.

The apparatus used consisted of a wooden hopper having the shape of a truncated pyramid, in the bottom of which—the smaller end being downward—apertures of different shapes and sizes could be inserted, these being closed by a round, flat plate, on which the pressure of the sand was exerted, and attached to the end of a scale-beam, by means of which equilibrium could be maintained; this served to measure the pressure. The diameter of the circular apertures used varied from 20 to 2.12 cm. (7.87 inches to 0.83 inch). For observing the alterations of form produced by collapse, the aperture in the base of the hopper was furnished with a short tube into which fitted a stopper capable of being raised or lowered. To obtain a record of the deformation taking place in the interior, when the sand was allowed to subside by the stopper being lowered, the former was arranged in the hopper in alternate colored and uncolored layers, and, when deformation had occurred, permeated by melted paraffine, which, on cooling, cemented the whole mass together in a solid body admitting of being sawn through, thus showing in section the nature of the alterations in form. These experiments proved that in the case of a circular aperture, on lowering the supporting stopper, a vertical cylinder of sand having as basis the aperture itself, was set in motion, the subsidence in the various sand layers decreasing toward the upper surface, in the case of a slight subsidence the uppermost strata remaining undisturbed. The effects were similar in the case of rectangular apertures. The coloring matter used was fuchsin. The pressure exerted when the hight to which the sand is piled exceeds a certain dimension at which collapse occurs, is independent of that hight, and for a given kind of sand is a function only of the area and circumference of the subsiding basis—in other words, of the aperture. Calculated and experimental results showed a very close agreement.

Further investigations were undertaken with an inclined orifice in the bottom of the hopper. Another series of experiments was carried out to ascertain the nature of the slip-surface where the lateral support of a mass of sand gives way, the conditions obtaining in the case of retaining walls under various circumstances being imitated as far as practicable. The apparatus used was analogous to that already described, with the modifications necessary for recording lateral instead of a vertical pressure and collapse. The results observed show that with a retaining wall, the inner surface of which is vertical or inclined outward, a horizontal or upward displacement of the latter, or a turning motion about the inner edge of the base, is followed by the formation of a slip surface in the sand having an inclination with the horizon of $\frac{\varphi + 90^\circ}{2}$, where the surface of the sand is level; φ represents the natural angle of repose of the material used. This agrees with the conclusions of many previous investigators of the same problem.

Mr. Forchheimer also experimented on the effect produced by a process the converse of the preceding, where sand is displaced by the pressure of the retaining surface and forced backward. In this case he found that with a horizontal upper surface and vertical wall, when the mass of sand behind the latter was practically unlimited, a plane slip surface, having the inclination of the natural angle of repose, is formed, which does not pass through the base of the wall; where the mass is limited, this surface becomes steeper the nearer the posterior inclosing wall is to the anterior. Various other investigations of a less exhaustive character were made, the materials used being chiefly Rhine sand, another species of fine sand (*Goldstrensand*) and dust shot.

The Oregon.—A new and powerful vessel for the Guion line was recently launched by the well-known Scotch shipbuilders, Messrs. John Elder & Co. The vessel, which has been named the Oregon, is designed as an improvement on the Alaska, and it is expected that she will excel the performances of that vessel. Her dimensions are as follows: Length over all, 520 feet; breadth, 54 feet; depth, 40 feet 9 inches; the gross tonnage is about 7500 tons. The vessel has in all five decks. The extremities of the upper deck are well protected by extensive turtle decks, that at the forward part extending to about 100 feet aft from the stem. On the third or main deck accommodation is provided for 340 first-class, 92 second-class and 1100 third-class passengers. The first-class state-rooms are replete with all the fittings usual in the highest class of passenger steamers. The first-class dining saloon, which is placed in the midship part of the vessel forward of the machinery space, is a large and magnificent apartment, 65 feet long by 54 feet wide and 9 feet in hight, and it is so arranged that all the first-class passengers can dine together. Ample light and ventilation are given to the saloon by a cupola 25 feet long by 15 feet wide, extending up to a large skylight, which can be kept open even in the stormiest weather. The state-rooms throughout the ship are so arranged that nearly all of them are fitted for two passengers only, a great luxury and convenience to travelers. The second-class saloon is situated abaft the engine-room, and it will be fitted up so as to tend to the comfort of the passengers. The whole of the after part above the jigger or after-mast will be fitted up in a substantial manner for the steerage passengers. The greatest care has been taken in the lighting, ventilation and sanitary arrangements throughout. A complete adoption of the electric light on the incandescent principle will be made, adding greatly to the general effect of the tasteful decorations throughout. The Oregon is divided into 11 water-tight compartments.

The Pennsylvania Railroad is now building a gigantic inclined plane at Pittsburgh, up which teams and freight and passenger cars will be hauled by means of steel cables, now being made by the Hazard Mfg. Co., of Wilkesbarre. The plane has a total length of 840 feet, the rise being nearly 43 in the hundred. It is built on arches. The longest span is 232 feet, another one is 120 feet, and the rest 60 feet each. The cables to be used in hauling up cars are entirely of steel, and will be the largest steel cables ever made in this country. The engines which will furnish the motive power are nearly completed, and will be of 700 indicated horse-power. The total cost of the gigantic structure, complete, will be about $275,000.

A British contemporary remarks that American hay forks are largely imported into England, having proved to be far superior to English make, and the demand is said to increase every year.

Special Notices.

LATE PUBLICATIONS.

Drinker, Henry S., E. M.—Explosive Compounds, Machine Rock Drills and Blasting. Four folding plates and many illustrations, 406 pages, quarto, cloth; 1883. $5

This volume includes nearly all the changes and additions made in the second edition of the large work on Tunneling by the same author. It has been issued to enable those having the first edition of the large work, published in 1878, to supply themselves at reasonable cost with the additional matter incorporated in the second edition. In the present volume the author has embodied all that has been developed in the art of blasting, and in the uses and applications of compressed air up to date. The illustrations show the different types of rock drills, and their characteristics and efficiency are fully discussed by the author. Abstracts of American and European patents for rock drills are also included. A detailed history of the Hoosac Tunnel is given, with full working profile, showing monthly progress. There are also descriptions of the Sutro, Mt. Cenis, St. Gothard and other tunnels, showing systems of blasting and drilling, their cost, &c.

Sent postpaid, on receipt of price, by

DAVID WILLIAMS,

Publisher and Bookseller,

83 Reade St., NEW YORK.

Wanted.

WIRE BENDERS.

Parties having second-hand Benders, in good order, apply to the

NEW HAVEN WIRE CO.,

New Haven, Conn.,

or, 54 Cliff St., New York City.

Traveler Wanted.

A man having had some experience in selling Heavy Hardware and Ship Chandlery Hardware.

Address, stating age, experience, salary expected, &c., "W,"

Office of *The Iron Age*, 83 Reade st., New York.

Experienced Clerk Wanted.

An old Hardware house, to relieve the principal, want an experienced Salesman to manage the business, with a view to future partnership; must loan $5000 as guarantee of good intention, subject to return should services be declined after fair trial. Apply to GRIGGS & CARLETON,

202 Broadway.

Wanted.

A position in the Hardware business, by a young man of over 10 years' experience in buying, selling and general management. Object of change, good salary, first-class house and desire to go North. References given in New York, Philadelphia, or where wanted. Address, in confidence,

"LAWRENCE."

Care Thorne, Deveney & Co.,

Augusta, Ga.

Wanted.

Wrought and Cast Turnings, and all kinds of Wrought Iron Scrap.

Address, stating lowest price, point of delivery and quantity on hand,

SITES & GILL,

222 and 224 So. Third Street, Philadelphia, Pa.

For Sale.

The half interest in a Wholesale and Retail Hardware business in the City of Jacksonville, Florida. Sales last year, $250,000. Inquire of Holbrook Bros., 87 Beekman St., New York City; Perry & Co., Albany, N. Y.; McConnell & Co., Hornellsville, N. Y.; and of the proprietors,

BENEDICT & McCONIHE,

Jacksonville, Florida.

Business Opportunity.

FOR SALE—The whole or part interest in an established Hardware business in the largest city of Northern Ohio. This opportunity is worthy an investigation by any one desiring to engage in the Hardware trade. Address

"C. A. S.,"

Office of *The Iron Age*, 83 Reade st., New York.

SITUATION WANTED

to travel, by a young man, aged 22. Has had 4 years (active) experience in the Retail Hardware and Agricultural Implement trade, city and country. Not particular as to territory. Address "NEWARK,"

Office of *The Iron Age*, 83 Reade street, New York.

Position Wanted.

A young man who thoroughly understands the Hardware business, having had 5 years' experience desires a position. Address "IRON-63."

Office of *The Iron Age*, 83 Reade St., New York.

Special Notices.

LOVEGROVE & CO.,

152 N. Third Street,

PHILADELPHIA,

HAVE FOR SALE A LARGE STOCK OF

NEW AND SECOND-HAND

ENGINES & BOILERS

AND MACHINE TOOLS,

AT VERY LOW PRICES. ALSO,

One 700 lb. Steam Hammer,

FERRIS & MILES,

in first-class order, at very low prices. Write for prices, stating what you want.

One No. 5 Root Blower.

Good as new. Very low price.

E. BISSELL & CO.,

Wholesale Auctioneers,

LARGE TRADE SALE OF

Hardware, Table & Pocket Cutlery,

House Furnishing Goods, &c., &c.,

COMMENCING

Tuesday, August 7th,

and continued following days at 10 o'clock a. m., each day, at

83 Chambers and 65 Reade Sts., New York.

This sale will comprise large invoices of Hardware, Edge Tools, Files, Steel Squares, Try Squares, Plumbs and Levels, Axes, Strap and T Hinges, Wrought Butts, Planes, Saws, Hammers, Hatchets, &c., &c., direct from manufacturers. Also 40,000 dozen Table Knives and Forks, first and second quality; 1000 dozen Pocket Knives, 500 dozen Shears, &c., &c. Full particulars in future advertisements. All who desire to make consignments for this sale must send their invoices in by July 23d.

Southern Mineral Lands.

Rock City Real Estate Association is a chartered company composed of men of wealth and character in Tennessee. J. M. Hamilton, President; Ira P. Jones, Secretary and Treasurer; Henry E. Colton, late Geologist and Inspector of Mines for the State, is General Manager and Geologist. Have now for sale lands in Tennessee containing red fossil and brown hematite iron ore; coking and domestic coal in Tennessee and Alabama; gold, silver, copper and magnetic iron ore in North Carolina; manganese and zinc ore in Arkansas. Also timber and tan-bark lands.

Careful examinations and reports made of lands in any of the Southern States. Examination of titles made and abstracts furnished.

Address HENRY E. COLTON, Gen'l Mngr.,

Nashville, Tenn.

Wanted.

Treasurer in a Manufacturing business who can loan $17,000 for a year. Ample security. Good opening for a young man. Address

O. H. H.,

Box 318, Springfield, Mass.

Wanted.

HEAVY CASTINGS AND ROLLS.

Wanted to buy Old Heavy Castings and Rolls of all kinds. Address

MATTHEW GILL, Jr., & CO.,

1240 N. 9th St. (below Thompson St.) Philadelphia.

Executors' Sale.

PHILADELPHIA HYDRAULIC WORKS.

The Executors of the Estate of Isaac S. Waterman, deceased, offer for sale the Stock, Tools and Fixtures of the Philadelphia Hydraulic Works, together with the property n. e. cor. Washington ave. and 21st st. Lot, 125 x 200 feet. The works are running full time on orders.

For terms, &c., apply at No. 407 Library St.

FORECLOSURE SALE.

The two blocks of property formerly occupied by the Ransom Stove Works will be sold under foreclosure, separately or together, on August 1st, at Albany, N. Y. These premises are admirably adapted to manufacturing and foundry purposes, and have unsurpassed shipping facilities, both by rail and by boat. For particulars, address

EDW. T. REED, Attorney,

Albany, N. Y.

Metal Exchange Memberships

Bought and Sold by

WM. WILLIS MERRILL,

4 Stone Street, Room 69.

Dealer in

EXCHANGE MEMBERSHIPS.

CORRESPONDENCE IS SOLICITED

with parties having

MACHINERY TO BUILD,

Heavy work preferred.

Address

THE HARTFORD ENGINEERING CO.,

Hartford, Conn.

Wanted.

To purchase a light Locomotive, 3 feet guage, to run on a 16 lb. rail Lumber Road.

Address

BROOKS BROS.,

Seney, Floyd Co., Ga.,

or, S. B. LOWE,

Chattanooga, Tenn.

Rare Chance for a Thorough Hardware Man with Capital.

A leading hardware firm in Albuquerque, New Mexico, doing a good jobbing and retail business, wishes to increase its capital, and would associate with it, either as a partner or employee, a competent, experienced Hardware man with five to ten thousand dollars. References given and required.

For particulars, address

VOSE & CO.,

Albuquerque, New Mexico.

Special Notices.

For Sale.

The LARGE and EXTENSIVE SHOPS, MACHINERY and TOOLS of the Gibbs & Sterrett Mfg. Co., located in the City of Corry, Pa.

These Shops are very extensive and have a Foundry, both for Brass and Iron, attached, and have been used for the manufacture of the Climax Reaper and Mower, with a capacity to turn out 5000 Machines per year, besides doing a large business in building Steam Engines of from 10 to 80 horse-power.

Pattern, Tools and Machinery are in FIRST-CLASS ORDER, so that the works can be run right along. Such an opportunity for a company or individual to continue a good and paying business seldom offers, as the property will be sold on VERY REASONABLE TERMS AND PRICES.

The property is located at the Junction of the N. Y., P. & O. R. R. with the Buffalo, Pittsburgh & Western, and the Phila. & Erie R. R's, giving shipping facilities superior to almost any other point.

Parties desirous of examining the works will please call on Mr. T. A. ALLEN, President of the Corry National Bank, who will afford them facilities and give full information in regard to them.

I WILL ALSO SELL,

on equally reasonable terms and prices, the large and extensive SHOPS, MACHINERY and TOOLS of the Gibbs & Sterrett Mfg. Co. located in the City of Titusville, Pa. These Shops have done a large and flourishing business in the manufacture of Steam Boilers, Oil Well Drilling Tools, Iron Tanks, Heavy Forgings, and Machine Shop Work generally, and are in good order to continue such work, or any other Machine Shop Work parties may desire to do.

Parties wishing to examine these works will please call on Mr. G. C. HYDE, Cashier of the Second National Bank of Titusville, who will give them all information.

Please address communications to

R. S. BATTLES, Trustee,

Girard, Pa.

New Inventions.

Patentees desirous of introducing their inventions into the English Market are requested to address their circulars, with full particulars, prices and best discounts, to

S. & E. RANSOME & CO.,

10 Essex St., Strand, London, Eng.

(Wholesale Merchants and Factors for Engineers' and Ironmongers' Goods.)

NOTE.—All quotations must include free delivery to London or Liverpool.

SPECIAL NOTICE.

IN PRINT AND READY FOR DISTRIBUTION IN 30 DAYS A POCKET MANUAL FOR ENGINEERS EDITED BY JOHN W. HILL, Mechan l Engineer,

Member American Society of Civil Engineers;

Member American Association R. R. M. M.

EDITION TEN THOUSAND.

Of which, first 2000 copies will be furnished, postage prepaid, at one dollar ($1.00) each; subsequent copies will be furnished (postage prepaid) at one dollar and a half ($1.50) each. A pocket manual of useful information for mechanical engineers, steam users and mechanics, containing 224 pages (set in nonpariel type) of carefully selected data, formulæ and experimental investigations from the latest and most approved sources. Printed from electrotype plates, on white No. 1 book paper, in stiff morocco covers with cardinal edges. Size of page 4½ x 6¾ inches. From press of Robert Clarke & Co., Cincinnati, O. Published by **WILLIAM A. HARRIS,** Builder of Harris-Corliss Steam Engines, Providence, R. I., to whom all subscriptions for copies should be sent.

Wanted Immediately.

A FIRST-CLASS STEAM FITTER.

One accustomed to Steam Heating.

FRED. B. BANNAN,

Pottsville,

Schuylkill Co. Pa.

Wanted.

A practical File Foreman to take charge of our File Department; must thoroughly understand the machinery and process of manufacturing files in all the different departments. Correspondence solicited.

MICHIGAN SAW & FILE WORKS,

East Saginaw, Mich.

Notice.

An exceptionally well-situated site now to be had for a Merchant Bar Iron Rolling Mill, convenient in respect to railway and water facilities, with a large trade guaranteed in advance of the construction of the mill.

Apply to POST OFFICE BOX 422,

Toronto, Canada.

Manufacturers

desiring to locate where they will have cheap fuel and building material, superior shipping facilities by rail and river, affording direct communication with the rapidly growing States and Territories, combined with good social and healthful advantages, will find it to their interest to correspond with J. W. STEWART,

President Business Men's Ass'n,

Rock Island, Ill.

HOOPS & CLIPPINGS.

Wanted to buy Hoops, Clippings (of all kinds), Cotton Ties, &c., &c. Address

MATTHEW GILL, Jr., & CO.,

1240 N. 9th St. (below Thompson St.),

Philadelphia.

Wanted.

Cotton Bale Hoop Cuttings, Oily Wrought Iron Trimmings, Cast Iron Borings, No. 1 Wrought Scrap Iron. Address (naming price and point of delivery),

JOS. J. LIPPINCOTT & CO.,

131 So. Fourth St., Philadelphia, Pa.

Wanted.

The New York and New England Agency for a good brand of pig iron for foundry use. Also for a line of manufacture of sheet iron.

Address,

"IRON SALESMAN,"

Office of *The Iron Age*, 83 Reade st., New York.

Wanted.

By an able and thorough merchant, with long experience in nearly every branch of the Hardware trade, a suitable position; or would purchase, or share in, a small business.

Address H. LUTTGEN,

57 Montgomery St., Jersey City.

Special Notices.

NEW AND SECOND-HAND MACHINERY.

1 Engine Lathe, 39 in. swing, 18 ft. bed. 2d hand.
1 Engine Lathe, 36 in. swing, 20 ft. bed. New.
1 Screw-cutting Gap Lathe, 26 in. swing over bed, 48 in. swing over gap; bed 24 ft. long. New.
1 each Engine Lathes 26 in. swing, 10 ft., 12 ft., 14 ft., 16 ft., 20 ft., 24 ft. bed. New.
1 Engine Lathe, 25 in. swing, 16 ft. bed. New.
1 Engine Lathe, 23 in. swing, 16 ft. bed. 2d hand.
1 each Engine Lathes, 21 in. swing, 6 ft., 8 ft., 10 ft., 12 ft. bed. New
1 each Engine Lathes, 20 in. swing, 6 ft., 8 ft., 10 ft., 12 ft. bed. New.
1 Engine Lathe, 20 in. swing, 8 ft. bed. 2d hand.
1 each Engine Lathes, 19 in. swing, 7 ft, 8 ft., 10 ft. bed. New.
4 Engine Lathes, 19 in. swing, 6 ft. bed. Nearly new
1 " 19 " " 7 " " 2d hand.
1 " 18 " " 6 " " New.
1 each Engine Lathes, 17 in. swing, 6 ft., 7 ft., 8 ft., 10 ft. bed. New.
1 Engine Lathe, 15 in. swing, 9 ft. bed. 2d hand.
2 " 15 " " 6 " " New.
1 " 14 " " 6 " " 2d hand.
1 " 13 " " 6 " " New.
3 " 13 " " 5 " " "
1 " 12 " " 5 " " "
1 " 11 " " 5 " " 2d hand.
1 " 11 " " 5 " " New.
1 " 10 " " 4 " " "
2 Hand Lathes, 15 in. x 5 ft. bed. New.
2 " 12 in. x 4 ft. bed. 2d hand.
1 " 12 in. x 4½ ft. bed. New.
1 " 12 in. x 4 ft. bed. New.
1 " 11½ in. x 4 ft. bed. New.
1 " 10 in. x 5 ft. New.
6 " 10½ in. sw., 3 x 4 ft. bed. 2d hd
5 Single Head Lathes, 13 " 4 ft. " "
1 Bench Lathe, 8¼ in. x 3 ft. bed. New.
1 Foot Lathe, 8½ in. x 3 ft. bed. New.
1 Foot Lathe, 12 in. x 4 ft. bed. New.
1 Foot Lathe, 8 in. x 2 ft. 8 in bed. New.
1 Turret Lathe. 2d hand. 16 in. x 5 ft. bed.
1 Axle Lathe. New.
1 Planer to plane 32 in. x 32 in. x 9 ft. Nearly new.
1 Planer to plane 31 in. x 30 in x 6 ft. 2d hand.
1 Planer to plane 34 in. x 32 in. x 12 ft. 2d hand.
1 Planer to plane 27 in. x 27 in. x 7 ft. New.
1 Planer to plane 24 in. x 24 in. x 8 ft. New.
1 Planer to plane 24 in. x 24 in. x 6 ft. New.
1 Planer to plane 22 in. x 22 in. x 5 ft. New.
1 Planer to plane 20 in. x 20 in. x 4 ft. New.
1 Planer 20 in. x 4½ ft. 2d hand.
2 Planers to plane 16 in. x 16 in. x 3 ft. New.
3 Crank Planers. New.
2 Shapers, 15-in. stroke, 23-in. traverse. New.
1 Shaper, 12-in. stroke, 33-in. traverse. New.
1 Shaper, 12-in. stroke, 18-in. traverse. New.
2 Shaping Machines, 7-in. stroke. 2d hand.
1 Back-geared Milling Machine. New.
1 Milling Machine, with Arm. New.
1 Hand Milling Machine. New.
5 Lincoln Millers, worm feed. 2d hand.
1 Index " 2d hand.
1 Vertical " "
3 Hand " "
1 Double face" "
1 Automatic Milling Machine. New.
1 40-in. Radial Drill. New.
1 48-in. " "
1 42-in. swing Upright Drill, B. G. & S. F. New.
3 24-inch Up. Drills, Bk. Gr. and Self Feed. New.
1 20-inch Lever Feed Upright Drill. New.
1 20-inch Lever and Wheel Feed Upright Drill. New.
1 Sensitive Drill New.
1 4-Spindle Drill Press. New.
1 3 " " " "
1 2 " " " "
7 Gang or Multiple Drills, 2, 3 and 6 spindles. 2d hand.
1 Single Spindle Light Drill, Table Feed. New.
1 Single Spindle Profiler. New.
1 Two " " Light. New.
2 Profilers. 2d hand.
2 Turret Head Chucking Machines. 2d hand.
1 Broaching Machine. 2d hand.
1 Cutting Off Machine, 3¼ in. 2d hand.
1 No. 1 Screw Machine, wire feed. 2d hand.
1 Screw Machine. New.
1 " Slotter. "
1 Cutter Grinder. "
6 Emery Grinders. New.
1 Slitting or Circular Shear. New.
2 Tapping Machines.
1 12-in. Slotting Machine, 50-in. swing. New.
1 8-in. " " 36-in. swing. New.
1 Hydraulic Wheel Press for 72-in. Wheels. New.
1 13 ft. Bending Rolls. 2d hand.
1 40 in. Car Wheel Borer. 2d hand.
1 Squaring Shear, 22 in. New.
3 Hand Shears. 2d hand.
3 Power Presses. New.
1 Foot Press. New.
1 Screw Press. New.
1 Drop Press. New.
1 Drop Press, 50 lb. Hammer. 2d hand.
1 Lot Heavy Tobacco Frames 2d hand.
2 Shifting Straighteners. New.
1 8 x 8 Upright Engine. New.
1 10 x 12 Horizontal Stationary Engine. New.
1 9¾ x 12 in. Horizontal Stationary Engine. New.
1 5 in. x 6 in. Horizontal Stationary Engine. New.
1 5 x 12 Horizontal Stationary Engine. 2d hand.
1 10 H. P. Cylinder Boiler. 2d hand.
1 10 H. P. Upright Boiler. New.
1 10 H. P. Upright Boiler. 2d hand.
1 No. 1 Steam Pump. 2d hand.
2 Grindstones and Frames. New.

Wood-Working Machinery.

1 Double Saw Bench. New.
1 24-in. Surfacer Rotary Bed. New.
1 Band Sawing Machine. New.
1 Scroll " "
1 Rod Machine. Self Feed. "
1 Sandpapering Machine. 2d hand.
1 8-in. Molder, 4 sides. 2d hand.
1 Edge Molding Machine. 2d hand.
1 Daniels Planer. 2d hand.
1 Large Lot 2d-hand Pulleys and Hangers.
And lot of others, both new and 2d hand.

If the list does not contain what you want, write us,

J. M. BADGER & CO.,

49 DEY STREET, New York City.

For Sale.

THE WHOLESALE AND RETAIL

HARDWARE AND STOVE

BUSINESS

OF

F. J. HOGAN & CO.,

Little Rock, Ark.

LONG ESTABLISHED. A CLEAN STOCK OF ABOUT $20,000. SATISFACTORY REASONS FOR SELLING.

FOR SALE.

BLOWING ENGINE.

Dimensions: Engine Cylinder 32 in. diam., 8 ft. stroke; Blowing Cylinder 7 ft. diam., 8 ft. stroke; Engine Fly-Wheel, 24 ft. diam., weight 25 tons. Also another Engine 18 in. x 36 in., with large Wheel, driving three Blowing Cylinders 40 in. x 6 ft. each. Will be sold cheap. All in good order. Must be moved.

A. G. BROOKS & WINEBRENER,

Third street, below Vine street, Philadelphia.

Wanted.

To exchange Topeka Real Estate for Hardware.

Address H. N. CASTLE,

Topeka, Kansas.

Rolled Iron Beams.

Specifications will be received for 30 days for 200 tons, 15 and 30 feet long, for building.

Address "SPRATT."

451 W. 21st St., New York City

Special Notices.

New & Second-Hand Machinery.

FEB. 21, 1883.

1 Engine Lathe, 14 in. x 5, 6, 7 and 8 ft Grant & Bogert.
1 " " 26 in. x 12 ft., Grant & Bogert. New.
1 " " 45 in. x 15 ft. Good order.
1 " " 36 in x 12 12 ft. New.
1 " " 42 in. x 14 ft. New.
1 " " 14 in. x 6 ft. Star Tool Co. New.
1 " " 16 in. x 6 ft. New.
1 " " 14 in. x 5 x 6 ft. New.
1 " " 16 in. x 7 ft. Bridgeport. New.
1 " " 13 in. x 5 ft. and 6 ft. Ames. New.
1 " " 16 in. x 6, 7 and 8 ft. Ames. New.
1 " " 18 in. x 8 and 10 ft. Lodge & Barker. New
1 " " 27 in. x 10 in. Lodge & Barker
1 " " 22 in. x 12 ft. New.
1 " " 20 in. x 10 ft. New.
1 " " 28 in. x 16 ft. New.
1 " " 24 in. x 12, 14 and 16 ft. New.
1 " " 11 in. x 4 ft. and 5 ft. Prentiss. New
1 " " 12 in. x 5 ft. Young. New.
1 Plain Engine Lathe, 16 in. x 4 ft. New.
1 " " " 15 in. x 4 ft. New.
1 Fox Lathe, 15 in. x 5 ft, Am. Tool & Machine Co.
1 15 in. x 4 ft. Turret Lathe. Lodge & Barker.
1 Fox Turret Lathe, 16 in. x 6 ft. Lodge & Barker. New
1 Planer, 50 in. x 50 in. x 17 ft. Good order.
1 " 32 in. x 32 in. x 7 ft. Good order.
1 " 16 in. x 16 in. x 3 ft. New.
1 " 22 in. x 20 in. x 5 ft. New.
1 " 24 in. x 24 in. x 6 ft. Hendey. New
1 " 26 in. x 26 in. x 7 ft. New.
1 " 16 in. Lever Table Drill. New.
1 Crank Planer, 16 in. x 16 in. x 13 in. New.
1 16-in. Upright Drill. New.
1 20-in. " Prentiss. New.
1 24-in. " Prentiss. New.
1 30 in. " Prentiss. New.
1 25-in. swing B. G. & S. F. Drill. Blaisdell. New
1 28-in. " " " "
1 38 in. swing, B. G. & T. F. Drill. New.
1 15-in. Shaper, Gould & Eberhardt. New.
1 10-in. Shaper, Gould & Eberhardt. New.
1 15-in. Shaper. Hendey. New.
1 24 in. Shaper, Hendey. New.
1 24-in. Shaper. Hendey. Good order.
1 9-in. Shaper. Hewes & Phillips. New.
1 9-in. Shaper. New.
1 14-in. Shaper.
Full Assortment of Milling Machines, Spindle Drills, &c., of Garvin's. New. & Lamson.
1 each Nos. 2 and 4 Screw Machines, Wire Feed. Jones
2 No. 2 Lincoln Millers. Good order.
2 No. 2 Lincoln Millers. New.
1 Hand Lathe, 12 x 4, 5 and 6 ft. New.
1 Hand Lathe, 16 in. x 6 and 7 ft. New.
1 Boring and Turning Mill, 50 in. New.
1 Boring and Turning Mill, 72 in., 2 Heads. New.
1 each 3 and 7 spindle Nut Tappers. New.
1 Gig Saw. Good as new. Rogers.
1 700-lb. Steam Hammer. Ferris & Miles. Good order

New York Agency of

THE TANITE CO. and GRANT & BOGERT MACHINE TOOL WORKS,

H. PRENTISS & CO., 42 Dey St., N.Y.

For Sale.

Established 1873. Gardner Bros "Standard Savage" Fire Brick Works, situated at Ellerslie Station, Md., on Baltimore and Ohio R. R. Also on Bedford Branch of P. R. R. Has convenient shipping arrangements on both roads. Works consist of two independent plants of machinery, so constructed and arranged that they can be run separately or together. One of the buildings entirely new, erected last year. Capacity of works, over 14,000 bricks per day. Mount Savage clay in abundance, mined on royalty, and delivered direct into works by gravity. Inclined plane and tram road, large portion of which was laid with new Tee rail last year. New artesian well, capacity over 35 barrels per hour. Also mountain stream, delivering water by gravity into tanks at works. Seven acres of land, with nine good tenements. Everything in first-class order for manufacturing and shipping brick direct from kilns into cars. Good and growing trade established. Brick unquestionably as good as the best made of Mount Savage clay. Statements of business done will be shown to responsible parties desirous of purchasing. Our good will and influence to go with sale. Any further information desired will be cheerfully given by

GARDNER BROS.,

Lockport, Pa.

For Sale.

Established in 1864. Gardner Bros.' Gas Retort and Fire Brick Works, situated at Lockport Station, on P. R. R., 60 miles from Pittsburgh, Pa. The works consist of complete plant for manufacturing Clay Gas Retorts, Settings, Blocks, Tile and Fire Brick. Capacity, about 100 retorts, with necessary settings, and 100,000 fire brick per month. Clay and coal mined by ourselves within short distance of works and hauled in wagons. Over three acres of land, with all necessary buildings, a number of tenements and town lots. P. R. R. has side track alongside our kilns. Good trade established. Our good will and influence to go with sale. Statement of business done will be shown to responsible parties desirous of purchasing. Any further information desired will be cheerfully given by

GARDNER BROS.,

Lockport, Pa.

For Sale.

The most prosperous Hardware, Stove and Implement business in Indiana; established ten years; in the "peerless little city" of Frankfort, Ind.; has 5000 inhabitants; surrounding country rich; four railroads and plenty of free gravel roads. Will sell stock alone and rent building, or sell both. Building is 130 x 30 feet, brick, iron and stone; has three floors, 130 x 30 ft., and one 90 x 30. Building has gas and water works of its own. Will sell for cash, or five good time for acceptable paper. Reasons for selling: Firm have manufacturing and other outside interests that demand their attention. Call on, or address,

MARVIN, BOOHER & PRICE, Proprietors,

Frankfort, Indiana.

For Sale.

The Industrial Works of Shamokin, owned and successfully carried on for a number of years by the late Wm. Brown, deceased, consisting of Foundry and Machine Shop, and a large stock of Patterns regarded as part of the property. Boiler Shop, Blacksmith Shop and Factory for the manufacture of heavy coal screens. Well located in the borough of Shamokin, Pa., with the best facilities for shipping by rail, and surrounded by a district contributing all the work that a shop of that kind can possibly turn out. Easy terms of payment are offered to suit a purchaser of limited capital. For list of Tools and further particulars apply to

WM. McILVAIN & SONS,

Manufacturers of Boiler Plate and Tank Iron,

Reading, Pa.

FOR SALE.

No. 6 Baker Blower, Nos. 4 and 6 Sturtevant Blower, No. 6 McKinzie Blower; Cupola, 48 inches; Crane, 15 tons; 2, 4, 6 and 10 H.-P. Baxter Engines; Planer, 20 x 16 x 4 ft., $250; do., old style, 20 x 20 x 5, $200; Engine Lathe, 30 in. x 14 ft., $350, &c.

Purchases of new and second-hand machinery carefully made, at low rates, for parties out of the city.

C. R. BIGELOW, M. E.,

18 New Church St., New York City.

For Sale.

One steam excavating machine built by John Souther & Co., of Boston, Mass.; is in working order and has 18 four-wheeled ten-ton dump cars with it; 15 of these cars are ready for immediate use. For further information apply to

A. A. AVEILHE,

Pur. Agt. S., F. and W. R'way, Savannah, Ga.

WANTED.—A Position by a gentleman who has had 15 years' experience in General Hardware, House Furnishing and Agricultural Implements. Capable of taking entire charge of business. Posted in buying. Good references.

Address "FORKS."

Office of *The Iron Age*, 83 Reade St., New York.

Trade Report.

BRITISH IRON AND METAL MARKETS.

[*Special Cable Dispatch to The Iron Age.*]

LONDON, WEDNESDAY, July 18, 1883.

Scotch Pig.—The market continues active, with prices unchanged, except for Langloan, which has advanced 6d. The following are makers' prices:

Coltness,	alongside,	Glasgow	61/
Langloan,	"	"	60/6
Gartsherrie,	"	"	57/6
Summerlee,	"	"	57/6
Carnbroe,	"	"	55/
Glengarnock,	"	Ardrossan	55/
Eglinton,	"	"	49/
Dalmellington,	"	"	50/
Shotts,	"	at Leith	59/6

Lighterage from Ardrossan to Glasgow is 1/ ₱ ton.

Cleveland Pig.—Business continues good and prices are firmer. We quote as follows, f.o.b. shipping ports:

Middlesboro'	No. 1 Foundry	43/6
"	No. 2 "	41/6
"	No. 3 "	39/6 @ 40/
"	No. 4 Forge	38/

Bessemer Pig.—The market is steadier. Prices are unchanged. W. C. Hematites are quoted 49/6 @ 51/ for mixed lots, Nos. 1, 2 and 3, equal portions, f.o.b. shipping ports.

Blooms.—Nothing doing.

Manufactured Iron.—The strike among the puddlers for increase of pay is about over, the men in some of the establishments having accepted the proposition of the makers and resumed work. In others they are still holding out. The probability is that all will return to work. Prices are a little firmer. We revise our quotations from works:

		£	s.	d.	£	s.	d.
Staff. Ord.	Marked Bars	7	10	0 @	.....		
"	Medium "	6	5	0 @	6	15	0
"	Common "	6	0	0 @	6	5	0
Hoops, 20 W. G. and over.							
"	Common Best	7	0	0 @	7	5	0
"	Medium	6	5	0 @	6	15	0
"	Common	6	10	0 @	.....		
Sheets, 20 W. G. and under.							
"	Ordinary Best	8	15	0 @	9	5	0
"	Common	8	0	0 @	8	5	0
Welsh Bars		5	5	0 @	5	7	0

Steel Rails.—The market continues irregular. Ordinary Sections are quoted at £4. 15/ @ £5. 5/, f.o.b. shipping ports.

Iron Rails—Dull and nominal. Welsh, 30 lb and upward, are quoted, nominally, £4. 15/ @ £5. 10/, f.o.b. shipping ports.

Old Rails—Are irregular. Old D. H.'s are quoted £3. 12/6 @ £3. 17/6, c.i.f. New York.

Scrap.—The market is irregular. Heavy Wrought Scrap is quoted £3. 5/ @ £3. 7/6, c.i.f. New York. Bessemer Crop Ends, run of the mill, are quoted 58/6 @ 60/6, f.o.b. shipping ports

Copper.—The market is quiet at unchanged prices. Best Selected is quoted £69 @ £70, and Chili Bars, £63. 15/ @ £64. 5/.

Tin—Is a little weaker. Straits Ingot, spot, is quoted £92. 5/ @ £92. 15/, and futures, £93. 5/ @ £94.

Tin Plates.—There is a better tone to the market, and prices are a little firmer. We quote:

Tin Plates, 10 x 14,	1st qual.	Charcoal	19/6 @ 21/6
" "	2d "	"	18/6 @ 19/
" "	1st "	Coke	17/6 @ 18/
" "	2d "	"	16/6 @ 17/

Spelter.—There is no change to note. Ordinary is quoted £15 @ £15. 2/6 at shipping ports.

Lead—Quiet and unchanged. Common English Pig is quoted £12. 15/ @ £13.

Freights.—Steam from Glasgow to New York, 7/6; Liverpool to New York, 6/@8/; Liverpool to Philadelphia, 7/6 @ 8/, and London to New York, 7/6 @ 9/6.

TRADE AND FINANCE.

Office of *The Iron Age*,
WEDNESDAY EVENING, July 18, 1883.

A quiet but hopeful tone pervades business circles in nearly every department. Conjectures respecting the operation of the new tariff, and doubts concerning the crops, are elements no longer found in the general situation, and although questions touching the stability of the currency system and the policy of the Government under a new Congress will at no distant day distract attention, business in all lines is apparently shaping itself for an early renewal of activity. A special reason for satisfaction is found in the removal of the high speculative prices which have so long barred the export trade, but the recent decline has failed to impart that impetus which it seemed reasonable to expect, and of which the state of the foreign markets does not yet afford positive assurance. An impediment in the same direction grows out of the hostility of the German Government to American hog products, and the attempt of England to exclude American live cattle.

Trade generally is characterized by summer dullness. The managers of 25 leading clearing houses in the United States give the clearances for the week ending July 14, 1883, $925,441,720; July 14, 1882, $1,076,791,369—a decrease of 13.9 %. Outside of New York 11 cities show an increase, including most Western points, and in Southern manufacturing cities trade appears to be prospering. *Bradstreet's* reports 140 failures in the United States during the past week—four more than the preceding week, 16 more than the corresponding week of 1882, and 50 more than the same week of 1881.

The weekly bank statement was favorable, showing an increase of $1,873,775 in surplus reserve, which now stands at $8,517,925, against $10,559,950 at the same time last year, and $11,215,725 at the corresponding date in 1881.

Cutting freight rates by some of the pool lines provokes high feeling, and an early meeting at the Commissioner's office is expected, to avert, if possible, the threatened rupture. In dry-goods orders, importers have made heavy deliveries on withdrawals from bond since July 1, and there has been some inquiry from the most distant Western and Southern markets. In the produce market, wheat has improved since Monday, in response to better cable advices from Europe, and exporters show a much better spirit, but operations are retarded by the scarcity of ocean tonnage and consequent high rates of freight. The flour market does not sympathize with the stronger tendency of wheat, and is unsettled. Corn finds a moderate demand at prices fairly sustained. Cotton is moderately active for future delivery on a lower basis. The key to the situation is "too much cotton." In lard there is a good deal of activity as the week closes, at an advance, both here and in Chicago. Pork shares in the upward movement. Sugar is fairly active, but buyers will not meet any further improvement. Coffee, Brazil grades, continues slow. Wool, for domestic fleece, is unsettled and the market nominal. In tobacco rather more interest is shown by export buyers, with a steady range of prices.

Crop reports continue highly favorable, despite croakers on the Produce Exchange. The only set-back in the Northwest comes to us from Northern Minnesota and Dakota, where the spring wheat crop is very backward. Corn is doing well everywhere, and making amends for its late start. Cotton reports through the South are promising.

The imports of foreign dry goods at this port for the week amount to $2,300,931, showing a decrease of $402,202 as compared with last week, and a decrease of $281,086 as compared with the corresponding week last year. The total imports since January 1, 1883, have been $66,746,692, against $70,080,690 for the same time in 1882, or a decrease of $3,343,998. The exports of domestic produce from this port during the week, although exhibiting an increase compared with the previous week, are still quite moderate, their total being $6,039,319, against $6,728,132 for the same week last year. There is a fair movement of provisions, but the shipments of petroleum have fallen off somewhat, while breadstuffs continue to move out about as usual. The exports of cotton are light. Since January 1, the exports aggregate $188,767,901, compared with $173,308,246 for the corresponding period of 1882. The exports of specie since January 1 are less than $8,000,000, against about $36,500,000 to the same time in 1882.

The business of the new Stock Clearing House commenced this morning, beginning as an experiment Western Union, Lackawanna, Union Pacific and St. Paul common.

The posted rates for bankers' sterling were reduced to $4.84½ for 60-day and $4.88 for sight. The market is weak, and bullion dealers think importations of gold later in the season quite probable, should there be heavy exports of produce or free buying of American securities.

Money is plenty on call at 2 @ 2½ %, and 60 to 90 days' indorsed bills receivable are quoted 5 %; four months' acceptances, 5 @ 5½ %.

On the Stock Exchange no new features have been developed. The weakness manifested for some time past was varied on Tuesday by a reactionary tendency, but business, as a whole, is left to professional traders. New York Central was affected by reports unfavorable to its financial condition, and Lackawanna was depressed by statements that $5,000,000 of new bonds would be issued to complete its western extensions. The threatened strike of the Western Union employees also had its influence. To-day prices declined through nearly the entire list New York Central leading, but closed steady. The changes, however, were only fractional. The latest dealings were in Lackawanna at 123¾, 123, 123⅞; Canada Southern at 57, 56½, 57⅜; Western Union at 79⅞, 79¼, 80, 80⅛; Lake Shore at 106¼, 106½, 106⅝, 106⅞; Denver at 40½, 40, 40⅝; Oregon and Transcontinental at 79⅝ @ 80¼; Union Pacific at 92¼, 93, 92½, 92¾; Michigan Central at 87¾, 87⅝, 88¼; New York Central at 114¼, 114⅜, 115⅛; Jersey Central at 86⅜, 86, 86¼.

Government bonds closed steady, as follows:

	Bid.	Asked.
U. S. 5's, 1881, continued at 3½	101	—
U. S. 4½'s, 1891, registered	112⅝	112⅞
U. S. 4½'s, 1891, coupon	112⅝	112⅞
U. S. 4's, 1907, registered	118⅛	118⅞
U. S. 4's, 1907, coupon	118⅝	118⅞
U. S. 3 per cents	103	103¼
U. S. Currency 6's, 1895	127½	—
U. S. Currency 6's, 1896	129	—
U. S. Currency 6's, 1897	130	—
U. S. Currency 6's, 1898	132	—
U. S. Currency 6's, 1899	133	—

The returns of the foreign trade of New York for the month of June, now at hand, are regarded with more than usual interest, not only because they close the records of the fiscal year of the United States, but the period of waiting under the old tariff. The imports foot up $42,199,654, and prove to have been beyond expectations, but the increase is accounted for by the pressure to take advantage of the market when the

rates of duty were reduced. For the first half of the current year the imports amount to $236,365,554, which is nearly $15,000,000 less than for the same period last year—exclusive of specie, about $20,000,000 less. The shipments hence to foreign ports in June, exclusive of specie, amount to $27,868,321, against $27,413,100 in June, 1882. For the first half of the current year the exports make a total of $361,391,665, and show that, compared with last year, we have exported from this port $16,000,000 more produce and merchandise, and $20,000,000 less in specie and bullion, but the shipments, exclusive of specie, have been $45,000,000 less than for the year ending June 30, 1881. For the whole United States, a careful estimate shows that for the 11 months ending May 31 the balance of trade in our favor was nearly $113,000,000, which June will not materially vary.

GENERAL HARDWARE.

Trade is naturally light, but still it compares favorably with the corresponding period last year. The out-of town buyers here are looking round carefully, but have not as yet placed many important orders.

Nails are still in active demand and very short supply. Stocks are greatly broken, and sellers show the firmness naturally to be expected from such a state of the market. The stoppage of Western mills will materially strengthen this market. We continue to quote $3 as the usual price, from which concessions can be obtained only on desirable orders.

The American Machine Co., of Philadelphia, make the following announcement in regard to the prices of the Fluting Machines manufactured by them :

TO THE TRADE.

Complaints of the unprofitable state of trade of our Fluting Machines having been quite frequent of late, we have this day adopted 35 per cent. discount from list as the best price to the retail trade. Jobbers underselling this price will not only forfeit all rebates they might otherwise be entitled to, but, if continued, will be refused further supplies of these goods. "Original Knox" Fluting Machines subject to a special allowance of 25 cents each, as heretofore. All previous quotations are hereby withdrawn. As our object is to bring about a firm price, and to secure to every dealer a fair profit, we trust to receive from all a hearty co-operation for that purpose.

AMERICAN MACHINE CO.

PHILADELPHIA, July 11, 1883.

PRICE LIST OF AMERICAN MACHINE CO.'S FLUTING MACHINES.

Inch	4½	6	8
Crown......each,	$3.50	$4.00	$6.50
Inch	5	6	7
American......each,	$3.00	$3.40	$4.50
Inch	3½	5½	
Eagle......each,	$2.15	$2.85	
Inch	4½	6	8
"Original Knox"..each,	$3.50	$4.00	$6.50

The Penfield Block Co., Lockport, N. Y., have reduced the price of their Pulley Blocks, and Store and Warehouse Trucks, from discount 35 per cent. to discount 40 per cent.

The New Haven Staple Works, W. H. Goldey, 103 Chambers street, agent, have issued an illustrated sample card, which is, we believe, an entirely new thing in the Wrought Goods line, giving full-sized illustrations of Staples from ¾ inch to 4½ inch. This card is intended to be used by the retailer, who can show it to a customer in case of doubt as to the particular size required. It can be used in the sale of other Staples as well as those made by the above company.

The Henry B. Newhall Co. have been appointed general agents of the Young & Frazer Tool Co., Limited, Baldwinsville, N. Y., manufacturers of Forks, Hoes, Rakes, &c., and will carry a full line of their goods in stock at their New York warehouse.

The Champion Horse Nail Co., of Appleton, Wis., desire us to call the attention of the Eastern trade to the fact that Hotchkiss & Nichols, No. 14 Platt street, New York, are their agents, and will always keep in stock a full line of their Nails, and to whom the company would refer the Eastern trade for quotations and goods.

The Union Hardware Mfg. Co., of West Troy, N. Y., are putting on the market a very full line of Snaps and Rope Goods, which embody entirely new principles, and seem certain to take a prominent place in the market. Such of them as we have seen are well made and in all respects first-class goods. The principle of the Snap may be seen by the illustration in their advertisement, on page 33. Horace F. Size, 100 Chambers street, is their New York agent. The following are their list prices and discounts :

The Union Loop Harness Snap, Dis. 50&10 %.
Tinned.

	Per gross.		Per gross.
⅝ inch	$10.00	1¼ inch	$12.00
¾ "	10.00	1⅜ "	13.00
⅞ "	10.00	1½ "	14.00
1 "	10.00	1¾ "	15.00
1 " heavy	12.00	2 "	16.00

Union Loop Swivel Snap, Dis. 50&10 %.
Tinned.

	Per gross.		Per gross.
¾ inch	$18.00	1¼ inch	$19.00
⅞ "	18.00	1½ "	19.00
1 "	18.00	1¾ "	20.00
1⅛ "	19.00	2 "	20.00

Union Round Eye Swivel Snap, Dis. 50&10 %.
Tinned.

¾ inch $18.00

The Union Round Eye Snap, Dis. 50&10 %.
Tinned.

	Per gross.		Per gross.
⅝ inch	$11.00	¾ inch	$14.00
⅞ "	12.00		

The Union Open Eye Snap, Dis. 50&10 %.
For Bits, Chains, Traces, &c.—Tinned.

	Per gross.		Per gross.
⅝ inch Bit Snap	$12.00	⅝ inch Trace Snap	$16.00
⅝ " Chain Snap	13.00		

The Union Double Snap, Dis. 50&10 %.
Also Used as Trace Chain or Chain Repair Snaps.—Tinned.

	Per gross.		Per gross.
¼ inch	$12.00 net	½ inch	$18.00 net
⅜ "	15.00 net		

The Union Improved German Snap, Dis. 60&10 %.

	Per gross.		Per gross.
⅝ inch	$8.00	1¾ inch	$16.00
¾ "	8.00	2 "	16.00
⅞ "	8.00	Round Eye.	
1 "	8.00	⅝ inch	11.00
1 "	11.00	¾ "	13.00
1¼ "	13.00	1 "	16.00
1½ "	15.00		

The Union Strap Fastener, Dis. 50&10 %.
For Horse Ties, &c.

	Per gross.
Strap Fasteners, for 1 inch Strap	$18.00
" " " 1¼ inch "	19.00

The Union Leather Horse Tie, Dis. 50&10 %.
With Strap Fastener.

	Per doz.
1 inch Horse Tie	$13.50
1¼ inch " "	16.00

The Union Snap, with Rope Buckle, Dis. 50&10 %.
For Horse and Cattle Ties.

	Per gross.
¾ inch Snap and Rope Buckle	$25.00
" " " "	25.00
Rope Buckles	12.00

The Union Rope Horse Tie, Dis. 40&10 %.
With Rope Buckle.

	Per doz.
Hemp Rope Horse Ties	$8.00
Hemp Rope Horse Ties, one Snap and Rope Buckle	6.00
Jute Rope Horse Ties	6.00
Jute Rope Horse Ties, one Snap and Rope Buckle	4.50

The Union Cattle Tie, No. 1, Dis. 40&10 %.

	Per doz.
Hemp Cattle Ties	$5.50
Jute "	4.00

The Union Rope Halter, Dis. 40&10 %.

	Per doz.
Hemp Rope Halters	$5.50
Jute "	3.25
7-16 Jute "	2.80

The Union Web Halter, Dis. 40&10 %.

Hemp Web Halters, per doz., net	$8.10
Jute " " "	6.75

The Union Round Eye Snap, with Rope Buckle, Dis. 50&10 %.
For Horse and Cattle Ties.

	Per gross.
¾ inch Snap and Rope Buckle	$25.00
⅞ " " " "	25.00
¾ " " " "	25.00
Rope Buckles for ⅝ inch and 7-16 inch Rope	12.00

The Union Weight Cord, Dis. 40&10 %.

5-16th inch Black Braided Cord, with Snap, per dozen	$5.00

The Union Cattle Tie, No. 2, Dis. 40&10 %.
With Adjustable Stay Hook.

	Per doz.
Hemp Cattle Ties	net, $5.10
Jute " "	" 3.40

The Union Rope Halter Lead, Dis. 40&10 %.

	Per doz.
⅝ inch Hemp Halter Lead, with Snap	$4.00
⅝ " Jute " " "	3.00
7-16 inch " " " "	2.50
⅝ " Hemp Halter Lead, with Ring	3.25
⅝ " Jute " " "	2.25
7-16 " " " "	2.00

Breast Chains, Dis. 50&10 %.
With Union Double Snaps.—Tinned.

	Per doz.
24 inch C. Plate Breast Chains	$14.00
28 " " " "	16.00
32 " " " "	18.00
36 " " " "	20.00

Halter Chains, Dis. 50&10 %.
With Union Patent Snap.

	Per doz.
4½ feet Halter Chains	$8.00

Rein Chains, Dis. 50&10 %.
With Union Patent Snap.

	Per doz.
12 inch Rein Chain	$2.60
18 " " "	3.50
24 " " "	4.50

Horse Hitching Chains, Dis. 50&10 %.
With Union Patent Snap.

	Per doz.
30 inches long, Tinned	$6.00

In response to several inquiries, we give below the new list adopted by the American Screw Co. for the Bay State Tire Bolts :

Length, inches.	3-16 inch.	¼ inch.	5-16 inch.	⅜ inch.
1	.60	.80	1.10	2.20
1¼	.60	.80	1.10	2.20
1½	.60	.80	1.10	2.20
1¾	.65	.85	1.10	2.20
2	.70	.90	1.17	2.20
2¼	.75	.95	1.24	2.30
2½	.80	1.00	1.31	2.40
2¾	.85	1.05	1.38	2.50
3	.90	1.10	1.45	2.60
3¼	.95	1.15	1.52	2.70
3½	1.00	1.20	1.59	2.80
3¾	1.05	1.25	1.66	2.90
4	1.10	1.30	1.73	3.00
4¼	1.15	1.35	1.80	3.10
4½	1.20	1.40	1.87	3.20
4¾	1.25	1.45	1.94	3.30
5	1.30	1.50	2.01	3.40
5½	1.40	1.60	2.15	3.60
6	1.50	1.70	2.29	3.80

Discount 65 %.

IRON.

American Pig.—There is very little change to report in the condition of the Pig Iron market, which has been quiet, but firm, during the week. Buyers are hardly manifesting as much disposition as two or three weeks ago to make contracts for future delivery, but there is no evidence of any lack of confidence in prices on their part. We continue our quotations of $22 @ $23 for Foundry No. 1 ; $19 @ $20 for Foundry No. 2 ; $18 @ $19 for Gray Forge, within which range we hear of sales aggregating 3500 tons, besides those made at the Exchange. Many of the companies are sold ahead so that they cannot accept orders for delivery before the fall, particularly in the case of No. 1, and the production is still being lessened by the blowing out of furnaces.

Scotch Pig.—Shipments to this port are larger than has lately been the case, but, as much of this is imported to fill orders, there is no inconvenient amount pressing upon the market, and of some brands quoted there is no stock in New York. Prices are unchanged. We quote Eglinton, $21 @ $21.50 from yard ; Carnbroe, $22.50 @ $23, to arrive ; Glengarnock, $23 from yard ; Dalmellington, $21.50 from ship ; Summerlee, $23 @ $23.50 from ship ; Coltness, $24 from ship ; Gartsherrie, $24 from yard ; Langloan, $24 from ship.

Steel Rails.—The most important recent transaction has been the sale of 7500 tons at $39, to be delivered at Syracuse during July, August and September. We also note the sale of 3000 tons at $38 at mill, which is the usual quotation for Eastern mills. There is considerable inquiry, but the mills are so full that it is difficult to get deliveries before November.

Old Rails.—During the week there has been but little done in Old Rails, although there is some inquiry. We quote Ts $21 @ $22.

Bar Iron.—Transactions in Bar Iron during the past week have been quite light. The demand has been scarcely equal to that of a week ago, and the market was then considered very dull. Notwithstanding the falling off in demand, prices are fairly firm and without change. The manufacturers in Pittsburgh say that the prospects are very fair for a good trade during the early fall and winter months. The majority of the mills are running on about one-half to three-quarter time and the production, even on this basis, is in excess of the present demand. The stock of manufactured Iron on hand, however, being small, prices are well sustained, and concessions for Refined Iron on present quotations (1.9¢ @ 2¢) are the exception, and only made for very desirable orders. For local trade from store we quote Refined Iron at $2.30 @ $2.40, and Common at $2.10 @ $2.20.

Scrap Iron.—There has been a light movement in Scrap during the past week, at figures varying from $23.50 to $24 for Selected Yard, the quality being largely at variance. Ex-store is quoted at $23, and ex-ship at 50¢ less, per ton. There are buyers in the market who are bidding for a better grade of Scrap, but are unwilling to meet the price at which it is held, viz., $25.

New York Metal Exchange.

The following sales have been reported during the week :

THURSDAY, July 12.

500 tons	American Pig No. 1, Sept. del., at	$22.87½
45 "	Straits Tin, " " "	21¢
50 "	" " July-Aug. ship, at	20⅞¢

FRIDAY, July 13.

600 tons	Crop Ends, delivered July, at	$25.50
100 "	American Pig No. 1, Nov. del., at	22.87½
10 "	Australian Tin, Sept. del., at	21¢
25 "	Straits Tin, spot, at	21¢

SATURDAY, July 14.

No sales.

MONDAY, July 16.

100 tons	American Pig No. 1, Oct. del., at	$22.50
200 "	" " " " "	22.37½
10 "	Straits Tin, spot. at	21¢
25 "	" " August del., at	21¢
25 "	" " July-August ship, at	21¢

TUESDAY, July 17.

500 tons	American Pig No. 1, Oct. del., at	$22.25
200 "	" " " "	22.37½
500 "	" " " "	22.00
100 "	" " " "	22.12½
100 "	" " " "	22.12½
200 "	" " " "	22.12½
100 "	" " " "	22.00
100 "	" " " "	22.00
500 "	" " " "	22.00
100 "	" " Sept. "	22.00
200 "	" " " "	21.87½
200 "	" " " "	21.75
100 "	" " Oct. "	21.87½
50 "	Straits Tin, July-Aug. ship, at	21¢

WEDNESDAY, July 18.

25 tons	Straits Tin, July ship, at	20⅞¢
50 "	" " " "	20¾¢
25 "	" " July-Aug. "	20⅞¢
50 "	" " " "	20¾¢
50 "	" " August "	20¾¢
10 "	Australian Tin, August del., at	20.9¢

METALS.

Copper.—Sales for the week have not exceeded 300,000 lb Lake, at 15¼¢ @ 15⅜¢, while other brands continue selling at 14¢ @ 14¼¢. Gradually, it is to be presumed, a brisker demand will spring up not only for Copper, but for metals generally, as consumption has, on the whole, been steady, and in most metals up to expectations. The only difficulty has been the large production. The elements underlying general business are, however, admitted on all hands to be sound. As we proceed, it becomes more and more evident that the cereal crop of the country is not only very large—close upon 500,000,000 bushels of wheat and 1,800,000,000 bushels of Indian corn—but of excellent quality. Cheap food is in prospect, and while the purchasing power of the agricultural classes remains great, from high prices so far obtained, that of the remainder of the population will be enhanced by this very cheap food in prospect, which will compare favorably with the as yet remunerative average wages earned by the laboring classes. With such a sound basis to go on, there will be no cause for croaking ; on the contrary, there is every chance that we shall be vouchsafed a good fall trade, and that metals will do well, if not in point of price, at least in the amount absorbed by legitimate consumption. From London we received this afternoon the ensuing cablegram : "Market quiet at unchanged prices. Best Selected, £69 @ £70, and Chili Bars, £63. 15/ @ £64. 5/." Manufactures may be quoted as under : Bottoms, 24¢ ; Braziers, 24¢ ; Sheathing, 22¢, and Bolt Copper, 24¢.

Tin.—Our market during the week has been moderately active at 21¢ for large lines Straits Tin, while in a jobbing way it brings 21¼¢ @ 21⅜¢ ; L. & F., 22½¢. London has been fluctuating between £92. 10/ and £93, Straits Tin, while Singapore cables £94. 10/, cost and freight per steamer this way. During the first half of the current month shipments from the Straits settlements to the United States have been 500 tons, and to the United Kingdom only 150 tons. From the 10th to the 17th inst., 300 tons were shipped thence to New York, and 200 to London. We receive to-day the ensuing cablegram from the latter place : "Market a little weaker. Straits, Ingot, spot, £92. 5/ @ £92. 15/, and futures, £93. 5/ @ £94. *Tin Plates* have been in good request at steady prices. Stock does not accumulate. We quote at the close, large lines, ordinary brands, ℔ box : Charcoal Bright, $5.70 @ $6 ; do. Ternes, $5.15 @ $5.35 ; Coke Tin, $5.07½ @ $5.15, and do. Ternes, $4.75 @ $5. Liverpool is steady, and wires Coke 16 @ 16/3, and Charcoal, 18/6 @ 20/. People at Liverpool confidently look forward to better prices in the near future. From London we are told that there is a better tone to the market, and that prices are a little firmer.

Lead.—About 1000 tons Western and Newark Common Domestic sold, mostly August delivery, at from $4.35 down to $4.30, the market closing at $4.30 @ $4.35, and very quiet. Refined is held at $4.40. St. Louis has been quiet at $4.05 asked for Hard, and $4 bid ; for Soft $4.10 is asked there. Freight, 30¢ ℔ 100 lb from East St. Louis, this way. From London we receive to-day the ensuing cable message : "Lead is quiet and unchanged. Common English Pig quoted £12. 15/ @ £13." Manufactures are quoted as follows : Lead Pipe, 6¾¢ ; Sheet Lead 7½¢ ; Tin-lined Lead Pipe, 15¢ ℔ lb, and Block-tin Pipe, 45¢, less the usual discount to dealers.

Spelter and Zinc.—Common Domestic Spelter is if possible even more intensely dull than heretofore, and utterly featureless at 4½¢, while Silesian is nominally worth 5⅛¢. Bertha Refined we call 7¾¢ @ 8¢, and Bergenport, 9½¢. *Sheet Zinc* is quite active at 5⅞¢ @ 6¢. From London we are wired to the following effect : "There is no change to note. Ordinary quoted £15 @ £15. 2/6 at shipping ports."

Antimony.—There is a lack of demand just at present. We quote Hallet 9½¢, and Cookson, 10½¢.

OLD METALS, PAPER STOCK, &c

The purchasing prices offered by dealers are as follows :

Copper, heavy	℔ lb.	$0.12	@	....
" light	"	.10	@	....
Copper Bottoms	"	.10	@	....
Yellow Metal	"	.07½	@	....
Brass, heavy	"	.08	@	....
" light	"	.07	@	....
Composition, heavy	"	.12	@	....
Lead, heavy	"	.04	@	....
Tea Lead	"	.03½	@	....
Zinc	"	.02¾	@	....
Pewter, No. 1	"	.12	@	....
" No. 2	"	.08	@	....
Wrought Iron	℔ ton.	22.50	@	....
Light "	"	12.00	@	13.00
Stove Plate	"	11.50	@	12.00
Machinery "	"	14.50	@	15.00
Grate Bars	"	4.50	@	....
Stereotype Plates	℔ lb.	.04½	@	.05
Electrotype "	"	.04¼	@	.04½
Small Type	"	.05	@	.05½

The prices current (prices paid by local dealers) for Rags, &c., are as follows :

Canvas, Linen	℔ lb.	3½c.	@	4 c.
White Cotton, New	"	3½c.	@	....
" No. 2	"	2⅛c.	@	2¼c.
White, No. 1	"	3¾c.	@	4 c.
" No. 2	"	1½c.	@	2 c.
Seconds	"	⅞c.	@	1 c.
Soft Woolens	"	5 c.	@	6 c.
Mixed Rags	"	1¼c.	@	1⅜c.
Gunny Bagging	"	1⅛c.	@	....
Jute Butts	"	1¼c.	@	....
Kentucky Bagging	"	....	@	3¼c.
Book Stock	"	1¾c.	@	2 c.
Newspapers	"	1 c.	@	....
Waste Paper and Scraps	"	½c.	@	....
Kentucky Bale Rope	"	3½c.	@	4 c.

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending July 18, 1883.

Hardware.

Am. Cutlery Co.
Case, 1
Baker & Co.
Chains, cks, 17
Bavere, Administrada
Packages, 66
Black W.
Packages, 2
Boker Hermann & Co.
Hdw., cutlery and guns, pkgs., 104
Curley & Bro.
Cases, 2
Degrauw, Aymar & Co.
Mdse., cs., 10
Downing, Sheldon & Co.
Gun barrels, cs., 2
Durand J.
Nails, keg, 1
Field Alfred & Co.
Anvils, 68
Packages, 16
Mdse., cs., 20
Folsom H. & D.
Mdse., cs., 2
Frasse P. A. & Co.
Mdse., cs., 8
Frothingham & Workman,
Iron chains, cks., 2
Graef Cutlery Co.
Cases, 26
Hartley & Graham,
Mdse., cs., 2
Merch. Disp. Co.
Arms, cs., 12
Mach'y, pkgs, 42
Moore's J. P. Sons,
Mdse., cs., 23
Schoverling, Daly & Gales,
Gun barrels, cs., 14
Arms, cs., 10
Mdse., cs., 16
Vom Cleff & Co.
Mdse, cs., 9
Wiebusch, Hilger & Co.
Hdw., cutlery and Guns, pkgs., 41
Wells, Fargo & Co.
Cases, 10
Witte John G. & Bro.
Cutlery, cs., 11
Order,
Wheels, 2
Bundles, 244
Cases, 2

Iron.

Blakeley & Walbaum,
Bars, 8
Bond, Parsons & Co.
Pig, tons, 200
Baring Bros. & Co.
Blooms, 155
Rivet rods, bdls., 450
Bars, 6218
Wire rods, coils, 878
Rivet rods, coils, 954
Nail rods, bdls., 4499
Rolled, bdls., 48
Wire, bdls., 3726
Brown Bros. & Co.
Nail rods, bdls., 202
Bundles, 40
Crocker Bros.
Pig, tons, 200
Spiegel, tons, 224
Elliott, Sons & Co.
Ore, ks., 319,500
Lang W. Bailey,
Packages, 454
Lee James & Co.
Pig, tons, 100
Lefferts, Marshall & Co.
Mdse., cs., 12
Lillienberg N.
Bdls. and bars, 2102
Lundberg Gust.
Wire, bdls., 9014
Meyer G. A. & E.
Oxide, bdls., 18
Meissner, Ackermann & Co.
Wire, coils, 3174
Montell F. T. & Co.
Old iron, tons, 26
Naylor & Co.
Wire, bdls., 220
Bars, 4745
Spiegel, cks., 400
Pierson & Choate,
Spiegeleisen, tons, 785
Seligman J. & W. & Co.
Rails, 1000
Snow & Burgess
Nail rods, bdls, 405
Stetson M. & Co.
Pig, tons, 100
Stevenson, Pierson & Co
Pig, bdls., 9
Williamson J. & Co.
Pig, tons, 500
Wood, Niebuhr & Co.
Wire, pkgs., 240
Order,
Bess. pig, tons, 470
Pig, tons, 760
Pig, lot
Spiegel, tons, 150
Wire, bdls., 25
Sheets, bdls., 1383
Bars, 903
Bundles, 1853
Wire, coils, 5800
Hoops, bdls., 20
Cotton ties, bdls., 3691
Rods, coils, 18

Steel.

Abbott Jere & Co.
Cases, 8
Brown William
Packages, 100
Moss F. W.
Bundles, 121
Bars, 118
Cases, 4
Plock & Co.
Tires, 68
Wagner F. W.
Bundles, 441
Bars, 119
Order,
Rails, 3328
Tires, 36
Wire, bdls., 89
Bands, 241
Forgings, 118
Bars, 5
Cases, 2
Bundles, 30
Rails, 1139
Plates, 210
Casks, 8

Metals.

Bruce & Cook,
Tin plates, bxs., 587
Capple Woodenware Co.
Gun caps, cs, 22
Carter, Hawley & Co.
Tin, slabs, 164
Erie and Pacific Disp. Co.
Tin plates, bxs., 854
Field Alfred & Co.
Gun caps, cs., 7
Funk, Wagner & Co.
Stereo. plates, bxs., 35
Hall Wm. & Co.
Tin, slabs, 752
Lalance & Grosjean,
Mdse., cs., 2
Merrick & Co.
Tin plates, bxs., 150
Montell F. T. & Co.
Old brass, bdls., 5
Zinc, bbl., 1
Parsons & Co.
Tin plates, bxs., 1240
Black taggers, bxs., 150
Phelps, Dodge & Co.
Tin plates, bxs., 8756
Reid John
Baths, sinks, &c., pkgs., 31
Western Disp. Co.
Tin plates, bxs., 766
Winter & Smillie
Tin, slabs, 335
Order,
Tin plates, bxs., 26,653
Spelter, plates, 778
Spelter, ingots, 2306
Tin, ingots, 600
Zinc oxide, bbls., 800

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the week ending July 17, 1883.

	Quan.	Val.
Dutch West Indies.		
Cutlery, case.	1	$4
Buckles, case.	1	36
Ptlm., gals....	1211	133
Clocks, case..	1	5
Dutch East Indies.		
Ptlm., gals.	523,000	53,500
Bremen.		
Ptlm., gals.	575,600	46,000
Hdw, pkgs...	48	908
Copper, sacks	1641	20,000
Copper, bars.	106	3,277
Sew. ma., cs..	100	1,588
Ag. imp.,pkgs	10	594
Mach'y, pkgs.	5	354
Scales, cs.....	12	96
Hamburg.		
Hdw., pkgs...	30	1,708
Clocks, pkgs..	30	2,941
Ag. imp.,pkgs	132	2,640
Rifles, case...	1	254
Copper, bbls.	25	8,124
Pumps, pkge.	1	17
Sew. ma., cs..	6	100
Mach'y, pkgs.	11	3,920
Christiania.		
Steel spring..	1	30
Hdw., pkgs..	2	25
Gottenburg.		
Ptlm, gls...	195,750	17,650
Arendal.		
Ptm., gals..	73,057	5,600
Antwerp.		
Sew. ma., cs..	111	3,629
Ag. imp.,pkgs	48	495
Hdw., pkgs...	18	309
Mf. iron, pkge	1	6
Amsterdam.		
Sew. ma., cs..	2	120
Mach'y, pkgs.	6	340
Pumps, pkge.	1	52
Scales, case..	1	30
Copper, casks	18	3,600
Hdw., pkgs...	15	513
Rotterdam.		
Mf. iron, pkgs	6	129
Copper, bars..	545	3,686
Plb. mtl.,pkgs	11	175
Hdw., pkgs...	17	339
Pumps, pkgs.	7	600
Ptlm., gals.	270,895	21,444
Clocks, cs.....	4	50
Danish West Indies.		
Nails, kegs...	12	41
Chains, case..	1	137
Hdw., pkgs...	26	188
Pumps, pkge.	1	17
Ptlm., gals. ..	3200	331
Mf. iron, pkgs	8	73
Saws, case ...	1	62
Copenhagen.		
Clocks, cs	59	835
Hdw., pkgs...	7	230
Mach'y, pkgs.	31	572
Ag. imp.,pkgs	6	295
Gran. ironw'e cs...	2	40
London.		
Mach'y, pkgs.	30	3,798
Brass g'ds,cs.	2	160
Ptlm., gals.	619,219	51,121
Boiler.........	1	2,500
Pumps, pkgs.	5	451
Mf. iron, pkgs	10	160
Sew. ma., cs..	637	9,252
Ag.imp.,pkgs.	63	665
Hdw., pkgs...	93	2,302
Scales,cs.....	12	335
Clocks, bxs...	4	50
S'p'dware, cs.	26	1,035
Wash. mach., cs.........	10	1,000
Rifles, case....	1	192
Glasgow		
Hdw., pkgs...	20	386
Mach'y, pkgs.	7	490
Water wheel.	1	135
Stmpdwre,cs.	8	220
Sew. ma., cs..	190	3,100
Mf. iron, pkgs	15	321
Ag. imp.,pkgs	13	780
Gibraltar.		
Ptlm., gals.	159,000	15,500
Liverpool.		
Rifles, cs......	2	540
Carbines, cs..	25	4,500
Ag. imp.,pkgs	9	1,700
Mach'y, pkgs.	6	515
Car wheels...	2	60
Copper, bars.	234	8,120
Cop.mat.,bgs.	3110	26,271
Guns, cs......	19	417
Hdw., pkgs...	79	1,862
Sew. ma., cs..	5	172
Clocks, pkgs .	485	9,944
Arms, cs......	8	1,000
Leith.		
Ox. zinc, bbls.	100	896
New Zealand.		
Scales, cs.....	4	270
Sew. ma., cs..	176	4,005
Mf. iron, pkgs	837	6,606
Mach'y, pkge.	1	47
Nails, cs......	15	405
Ptlm., gals..	80,460	8,298
Clocks, cs.	78	863
Hdw., pkgs...	140	2,475
Ag. imp.,pkgs	17	220
Saws, cs......	3	245
Wringers, cs.	8	140
British Honduras.		
Sew. ma., cs..	7	104
Hdw., pkgs...	5	64
Ptlm., gals....	2200	225
Cutlery, cs....	5	89
Nails, pkgs...	79	363
Canada.		
Tin plts., bxs.	1000	3,622
Wire, cask...	1	89
Reg.antimony	2	111
Guns, case...	1	96
Havre.		
Ag. imp, pkgs	5	350
Mf. iron, pkgs	2	27
Copper, cks..	292	53,750
Clocks, case..	1	100
Sew. ma., cs..	12	200
Marseilles.		
Copper, bars.	348	8,126
Newfoundland.		
Hdw., case...	1	40
Mf. iron, pkgs	3	51
Ag. imp.,pkgs	12	237
Mach'y, pkgs.	2	67
New Brunswick.		
Tin cryst. cse.	1	47
Mach'y, pkgs.	31	3,800
Ptlm., gals..	12,500	1,370
Nova Scotia.		
Tin, pigs......	20	124
Mf. iron, pkgs	4	63
Clocks, case..	1	90
Shears, case..	1	34
Hdw., pkgs...	37	400
Heater........	1	100
Copper pans..	2	23
Stmpdwre,cs.	2	66
British Possessions in Africa.		
Ptlm., gals...	5200	511
Clocks, cs	2	45
Mf iron, pkge	1	29
British East Indies.		
Ptlm., gals.	794,460	80,668
British West Indies.		
Hdw., pkgs..	44	543
Mf. iron, pkgs	145	870
Ag. imp., pkgs	19	286
Clocks, cs	12	157
Nails, bxs.....	4	46
Iron safes....	2	142
Cutlery, cs....	2	54

	Quan.	Val.
Car wh., sets.	2	75
Mach'y, pkgs.	5	211
Ptlm., gals..	38,573	3,838
Scales, cs.....	19	255
Cartridges, cs	2	20
Sew. ma., cs..	46	484
Nails, kegs....	110	401
British Australia.		
Hdw., pkgs. .	719	11,609
Clocks, cs	313	6,713
Wringers, cs.	49	1,019
Nails, cs......	90	656
Cartridges, cs	4	65
Pumps, pkgs.	10	488
Sew. ma., cs..	94	2,275
Nails, kegs...	5	30
Tacks, cs.....	6	115
Ptlm., gals.	129,600	16,848
Mf.iron, pkgs.	48	1,915
Rivets, cs.....	12	222
Revolvers, cs.	2	163
Saws, cs......	39	1,773
Ag. imp.,pkgs	53	3,234
Mach'y, pkgs.	4	666
Cutlery, cs...	4	96
Cuba.		
Mf. iron,pkgs.	304	4,537
Sew. ma., cs..	25	563
Hdw., pkgs...	65	1,323
Brass g'ds, cs.	2	146
Mach'y, pkgs.	318	7,883
Iron tubes....	200	182
Spikes, kegs..	18	40
Iron safe.....	1	50
Metal, case...	1	28
Boiler tubes..	210	256
Steam pump.	1	242
Nails, cs... ..	32	130
Pumps, pkgs.	4	125
Ag.imp.,pkgs.	22	986
Ptlm.. gals...	200	48
Boiler.......	1	618
Scales, cs.....	6	71
Cutlery, case.	1	79
Clocks, case..	1	50
Nails, kegs..	40	120
Spikes, kegs..	200	563
Uruguay.		
Ptlm., gals..	10,500	1,595
Hdw.. pkgs...	10	170
Clocks, pkgs..	10	210
Ag.imp.,pkgs.	9	165
Brazil.		
Ptlm., gals..	54,690	5,207
Nails, kegs....	2	8
Porto Rico.		
Scales, case...	1	35
St. Loubes.		
Ptlm.. gals.	282,650	22,700
Les Sables D'Olonne.		
Ptlm., gals.	130,472	9,650
Cette.		
Ptlm., gals.	268,013	18,761
Hayti.		
Mach'y, pkge	1	26
Scales, case..	1	22
Ptlm., gals...	7566	780
Mf. iron, pkgs	13	189
Nails, bags...	30	94
Venezuela.		
Hdw., pkgs...	12	436
Mf. iron,pkgs.	94	276
Nails, pkgs....	10	68
Solder, case...	1	25
Clocks, cs.....	2	150
Mach'y, pkgs.	22	515
Sew. ma., cs..	15	320
Ptlm., gals....	2120	204
Iron safe.....	1	111
Scales, case...	1	28
Tacks, cs.....	3	47
Chili.		
Rifles, case....	1	192
Hrs shoes, kgs	40	170
Nails, bxs.....	110	705
Ag. imp.,pkgs	239	9,239
Saws, cs......	12	95
Hdw., pkgs...	377	7,128
Cartridges, cs	6	142
Sew. ma., cs..	24	451
Ptl., gals...	01,070	5,995
Nails, kegs...	410	1,214
Revolvers, cs.	2	082
Mach's, pkgs.	8	1,835
Mf. iron, pkgs.	12	123
Faucets, cs...	8	80
Cutlery, cs...	22	230
Peru.		
Nails, kegs....	500	1,509
Scales, cs.....	23	402
United States of Colombia.		
Cutlery, cs. ..	135	2,154
Ptlm., gals....	2385	296
Mf. iron, pkgs	243	2,520
S. m. oil, cs...	5	37
Br. g'ds, cs...	5	334
Y. met., case.	1	49
Cartridges,cs.	18	275
Steel, cs......	13	192
Nails, cs......	2	14
Iron safes....	5	351
Spikes, kegs..	25	141
Shot, pkgs....	8	134
Revolvers, cse	1	113
Iron bridge...	1	725
Chains, pkgs.	2	60
Lead, pigs....	100	819
Drags, pkgs..	159	5,501
Hdw., pkgs...	75	1,906
Sew.ma., cs..	350	8,070
Nails, kegs. ..	88	182
Mach'y, pkgs.	327	6,049
Clocks, pkgs..	28	699
Ag.imp.,pkgs.	17	251
Scales, cs... .	24	379
Iron, bundles.	118	1,102
W. closets....	3	30
Iron tanks....	7	680
Bath tubs....	2	235
Tin, pigs.....	9	245
Saws, case...	1	31
Cop. rolls, cse	1	305
Mexico.		
Ptlm., gals....	800	116
Mach'y, pkgs.	10	1,190
Pumps, pkgs.	2	38
Nails, pkgs...	68	228
Hdw., pkgs...	41	1,157
Tacks, cs.....	3	62
Cartridges, cs	47	1,879
Ag. imp.,pkgs	3	60
Railroad cars	2	1,800
Sew.ma.,pkgs	101	1,917
Mf. iron, pkgs	20	442
Mf iron, pkgs	3	266
Ld.pipes, tubs	2	74
Cutlery, cs....	19	422
Br. goods, cs.	2	67
Per. caps, cs..	4	215
Jacks.........	4	77
Revolvers, cs.	4	979
Iron tank.....	1	400
Nails, pkgs...	4	94
Stl wire, bdls.	10	100
Argentine Republic.		
Ag.imp.,pkgs.	2991	86,062
Ptl., gls.....	60,500	6,953
Tacks, cs.....	83	447
Irons, casks..	52	966
Mf. iron, pkgs	38	755
Sew. mach, cs	22	337
St'p'dw'e,cs..	4	265
Scales, cs....	153	5,604
Pumps, pkgs..	57	779
Mach'y, pkgs.	23	912
Hdw., pkgs...	552	14,751
Nails, pkgs....	50	840
Cutlery, cs....	96	1,301
Nails, kegs...	50	225
Clocks, case..	1	85
Fiume.		
Ptm., gals.	351,000	25,500
Genoa.		
Sew. ma., cs..	76	1,200
Piræus.		
Mach., pkgs..	2	130
Alexandretta.		
Ptm., gals.	180,000	16,200

	Quan.	Val.
Salonica.		
Ptm., gals.	211,500	19,300
Liberia.		
Mf. iron, pkgs	13	97
Ptm., gals	10,000	950
Arms, cs	21	675
Wheels and a., pkgs.	3	32
Nails, kegs	56	190
Scales, cs.	18	214
Hdw., pkgs	3	39
Sew. mach. cs	2	46
Clocks, case	1	21
Central America.		
Ptm., gals	168	19
Cutlery, cs	5	88
Hdw., pkgs	17	113
Mf. iron, pkgs	16	166
Japan.		
Ptm., gals.	440,000	40,000
Locks, case	1	50
China.		
Locks, cs	7	350
Mach., pkgs	3	150
Ptm., gals.	463,760	45,500

COAL.

A fair and satisfactory trade is in progress in Anthracite Coal. The business done is mostly a backward delivery of orders given at the old prices. The new orders are at an advance, and by the end of July the full circular prices may be realized. There is no more talk of short time, vessels having been frequently detained for cargoes. Local business is very quiet. We learn that the Reading company will, on August 1st, advance the tolls on all Coal not ordered previous to that date. The Reading's new western connections will soon be complete.

Bituminous Coal is as dull as ever at $3.75 @ $4, alongside. A large sale is reported at $2.85 ℔ ton, at Georgetown.

The total amount of Anthracite mined thus far in the year 1883 is 14,132,399 tons, compared with 13,119,089 tons for the same period last year, an increase of 1,013,310 tons.

FOREIGN TRADE MOVEMENTS.

Included in the imports were leading articles of merchandise valued as follows:

	Pkges.	Value.
Antimony	35	$1,343
Brass goods	62	4,028
Bronzes	9	598
Chains and anchors	5	305
Clocks	16	1,590
Copper	...	205
Cutlery	100	36,426
Guns	242	30,484
Hardware	29	2,877
Iron, pig, tons	3,512	77,772
Iron, sheet, tons	312	13,791
Iron, ore, tons	900	2,116
Iron, other, tons	992	24,842
Railroad bars	3,144	2,239
Lead, pigs	796	3,038
Machinery	34	5,103
Metal goods	182	15,401
Nails	1	70
Needles	18	6,102
Old metal	...	171
Platina	4	13,700
Percussion caps	51	10,720
Pins	10	1,695
Plumbago	50	250
Saddlery	12	1,795
Steel	13,473	48,786
Silverware	14	7,897
Tin, bxs	54,240	251,578
Tin 172 slabs; 8,742 ℔	.....	966
Wire	519	13,221

The quantity of metals and hardware imported during the past week compares with previous dates as follows:

	For the week.	28 weeks of 1883.	Same time 1882.
Cutlery, pkgs	100	4,298	3,871
Hardware, pkgs	99	704	585
Iron, R. R., bars	3,144	9,468	74,310
Lead, pigs	796	4,433	17,338
Steel, pkgs	13,473	2,152,756	1,116,588
Tin, bxs	54,246	1,020,721	1,220,555
Tin slabs, ℔	8 742	10,370,916	9,295,459

PHILADELPHIA.

Office of *The Iron Age*, 230 South Fourth St., PHILADELPHIA, July 17, 1883.

Pig Iron.—Business during the week has not been on a large scale, the majority of sales having been of small lots to cover immediate requirements. The tone of the market is slightly easier, buyers showing increasing indifference under somewhat larger offerings. Evidence that the recent movement was merely "a spurt" accumulates daily, and the general position is now very little different to what it was a month ago. Really good No. 1 Foundry Irons are scarcer than they were at that time, and mill Irons are also a shade firmer, but with these exceptions there is really nothing different to what was reported during last month. With a large decrease in production, there is probably less chance of stocks accumulating, but, so far as buyers are concerned, the supply appears to be about as it has been during the past six months. In other words, sellers are prepared to take all the orders offered at the regular current prices of the day, with the exception perhaps of a few favorite brands of Foundry Iron which are really scarce. This condition of affairs is a little disappointing, as there was a general expectation of a steady to strong market during the balance of the year, although no one had much confidence in higher prices. Without there being any developments of special weakness, there is, nevertheless, a change of feeling, and sellers have lost important advantages which were acquired during the close of last month and beginning of the present one. The movement in Pig Iron is a healthy one, however, and although holders are more disposed to sell than they were, it is probably not on account of financial pressure or of increasing stocks, but in the belief that prices are not likely to advance to an extent sufficient to pay for carrying, &c. This, while having a tendency to weaken prices for the time being, will be of service later on, and do much toward keeping the market in a steady and safe condition. The heaviest business in No. 1 Foundry Irons has been done on a basis of about $21.50 @ $22, choice brands at $23 @ $23.50, and, in a few instances, $21 has been accepted for brands comparatively new or unknown. No. 2 is rather quiet, with sales at $19.50 @ $20.50, delivered according to brand. Mill Irons are quiet, but steady. Large lots of Lehigh brands could be placed at about $17 @ $17.50 at furnace, but quotations are generally held at about $18 and from that to $19 for choice brands. The supply does not appear to be out of proportion to the requirements of consumers, but buyers and sellers are both firm, the former in resisting the demands for an advance, the latter in refusing to duplicate sales at prices paid during the first half of last month. The market may therefore be called dull, and in some directions easier, in others steady, with a fair degree of firmness.

Since writing the above the demand for good Foundry Irons has been very active, and prices have a decidedly upward tendency. Some of the Lehigh companies have advanced their figures to $22 at furnace, and as stocks are light, buyers will probably have to meet their demands. Other grades are firm, but not higher.

Bessemer Pig.—There appears to be a total suspension of business in foreign Iron, although sellers are willing to make concessions on $21, the recent asking price. With low freights, it is not unlikely that business will be done at about $20.50, at which figure, in all probability, a moderate amount will be taken within the next week or ten days.

Spiegeleisen.—Market quiet; buyers for the present show very little disposition to do business. Sellers ask $30.50 for 20 % and ask for counter offers of $30.

Blooms.—The market is very heavy, and while quotations are nominally unchanged, several transactions have been made at exceptionally low figures. For small lots we quote as before, viz.: Charcoal Blooms, $57.50 @ $60; Run-out Anthracite, $48 @ $50; Scrap Blooms, $42.50 @ $45; Northern Ore Blooms, $40 @ $42.50.

Muck Bars.—The demand is not active, and although many of the mills are full of work for several weeks to come, prices are inclined to droop. Sales of small lots reported at $34 @ $34.50 at mill, but for good-sized orders concessions would doubtless be granted.

Bar Iron.—The amount of business done during the week has not been important, but prices appear to be held with a fair degree of firmness. The demand is mainly for small lots, and as lower rates would probably not increase the amount, manufacturers are disposed to let buyers take their own course without endeavoring to force sales. At present there seems to be business enough to keep all the mills at work, although, as usual at this season, the output is not much beyond two-thirds, and in some cases barely that. Best Refined Iron sells at $2.2¢ @ 2.25¢ for the general run of orders, but for 50-ton lots and upward there is little doubt that concessions of more or less importance would be granted. Skelp Iron has been asked for in lots of 200 to 300 tons each, but we have not heard of any sales being made, as buyers consider 2.2¢, the asking rate, as altogther too high, considering the prices realized for their product.

Plate and Tank Iron.—The demand has not been of much importance, but prices retain all the firmness noted in recent reports. This is probably due to the fact that the mills have most of their capacity engaged for the next five or six weeks, and as there is a prospect of continued good demand during the fall of the year, there is no necessity for cutting prices. For specially desirable orders it is possible that slight concessions might be made, but for small lots sales are made at about last week's quotations, viz.: Ship Plate and Tank Iron, 2.4¢ @ 2.5¢; Shell Iron, 3¢ @ 3.25¢; Flange, 4¢ @ 4.25¢; Fire-Box, 5¢ @ 5.25¢.

Structural Iron.—The improvement noted in recent reports is fully maintained, and, while no very large orders have been placed during the week, manufacturers find it difficult to make deliveries as promptly as desired. Prices are firm, and, as there is a good deal of work in sight, it is probable that present quotations will be maintained. Sales have been on the basis of last week's quotations, as follows: Angles, 2.4¢; Tees, 3.2¢; Beams and Channels, 3.5¢.

Sheet Iron.—The market is more active than it has been, but there is no quotable change in prices. Buyers of large lots can obtain moderate concessions, but in ordinary transactions prices are firm. The demand for thin sheets has been quite active, and stocks of the high numbers are considerably reduced. We repeat last weeks' figures, as follows:

Common Sheets, No. 28	4½¢
Common Sheets, Nos. 26 and 27	4¼¢
Common Sheets, Nos. 21 to 25	4¢
Common Sheets, Nos. 18 to 20	3¾¢
Best Refined, ¼ % advance on the above.	
Best Bloom Sheets, Nos. 26 to 28	6¼¢
Best Bloom Sheets, Nos. 22 to 25	6¼¢
Best Bloom Sheets Nos. 16 to 21	6¼¢
Common Red Plates, 3-16 to 16	3.2¢
Best Bloom, Galvanized, discount	40 %
Second quality, discount	50 %

Wrought Iron Pipe.—This department of the market presents a quiet aspect, business having been of a very uniform character for several weeks past. Prices are weak and the position appears to be altogether in buyers' favor. Manufacturers, however, are of the opinion that an improvement may be looked for in about six or eight weeks. We quote the following discounts on small parcels: Boiler Tubes, 60 % off, and Gas and Steam Pipe, 70 % off list price, with additional discounts on special sizes, according to size of order.

Steel Rails.—There is considerable inquiry for summer deliveries, but mills are so full of orders that anything additional cannot be accepted without inconvenience. In some cases postponements have been arranged, so as to make room for pressing requirements, but there is still more business than can be readily attended to. Prices are firm—$38.50 @ $39 for summer and fall, and about $38 for winter—with a somewhat better feeling on all deliveries.

Old Rails.—There is more inquiry, but in the absence of spot lots there have been no actual sales. Old Ts are offered for shipment from Southern ports at about $22, and from present appearances considerable business will be done within the next 30 days. Buyers name $21 @ $21.50 as their idea of values. Double Heads are nominal at $25 @ $25.50.

Scrap Iron.—There is very little business doing at the moment. Cargo lots nominal at $23 @ $23.50, with buyers at about 50¢ less money. Choice Railroad Scrap commands $24 @ $25, f.o.b. cars.

Old Car Wheels.—Several sales of small lots at $17, Philadelphia, or its equivalent.

Nails.—The market is in a very satisfactory condition. Prices are steady and firm. The demand continues to absorb the output, which is somewhat curtailed on account of the hot weather. The usual selling price appears to be about $3.05 @ $3.10 for small lots, and on large orders we hear of nothing less than $3.

PITTSBURGH.

Office of *The Iron Age*, 77 Fourth Avenue, PITTSBURGH, PA., July 17, 1883.

There has been no important change in the business situation during the past week, and no material improvement can be expected this month, when farmers are busy harvesting and manufacturers are engaged in effecting settlements, taking stock and making repairs. The improved feeling, however, noted in our last report continues, and a good fall trade is anticipated. Manufacturers, almost without exception, are in much better spirit than they were a month ago; not only are the crop reports encouraging, but confidence, which had been disturbed by the recent failures, has been pretty well restored, and the outlook is in every way more encouraging than it has been at any time this year. Graff, Bennett & Co., it is stated, will get an extension, and, if so, will continue to run their mills and furnaces as though nothing had happened.

A number of the Iron and Steel mills have been stopped to take stock and make repairs, but will start up just as soon as these are completed. The Window-Glass factories all stopped on the 1st inst., as usual, and will remain idle until the 1st of September. A good many of the Coal and Coke works are also idle, but these will be started up whenever the condition of the markets is such as to make it an object.

Ore.—So far as the Lake Ore trade is concerned, the situation remains unchanged. The supply on the dock at Cleveland is very large, but production has been very materially curtailed, and an increased demand is looked for in the fall, when it is expected that a number of furnaces will be started up. The price of Republic Ore remains unchanged at $8 ℔ ton, delivered at Cleveland.

Pig Iron.—The position of the market remains substantially the same as noted in our report of a week ago; the firmness developed week before last continues, and while business is light and the demand, as a rule, is still confined to rupplying immediate wants, more activity is looked for before long. There are some consumers who, having little or no stock, and being apprehensive of an advance, are disposed to anticipate future wants, and we should not be surprised to hear, at any time, of some large sales having been made, providing furnacemen can be found willing to contract for future delivery at present prices. It is feared by some of the mill owners that if they wait until others want to buy, and they all go on the market about the same time, as is sometimes the case, they will have to pay more for it; hence they are disposed to take time by the forelock. We repeat former quotations:

No. 1 Foundry	$20.00 @ $21.00,	4 mos.
No. 2 "	18.50 @ 19.50,	4 "
Neutral Gray Forge	17 50 @ 18.00,	4 "
Warm-Blast Charcoal	25.00 @ 27.00,	4 "
Cold " "	26.00 @ 35.00,	4 "
Bessemer Iron	21.00 @ 21.50,	4 "

We can report small sales of Bessemer at $21, cash, but round lots, it is said, have been sold as low as $20.50, cash. Also, a small lot of extra Cold-blast Charcoal at $35.

Muck Bar.—There have been no sales reported for some time, in the absence of which we continue to quote at $34, cash.

Manufactured Iron.—Some of the mills report an increased demand, and all agree that the outlook has improved considerably within the past couple of weeks, and that the prospect for a good, healthy fall trade is becoming more and more assured. The indications now are that there will be a brisk demand in the early part of next month, by which time, it is expected, all the mills will be in operation. Prices remain unchanged, but firmer; some of the mills refuse to sell under a 2¢ base, while others are accepting orders at 1.95¢ and 1.90¢, 60 days, with usual discount of 2 % for cash. The regular quarterly meeting of the Western Iron Association, which was to have taken place last Wednesday, failed for want of a quorum, and the next one will be on the first Wednesday of October.

Nails.—There is a fair business at unchanged prices—$3, 60 days, 2 % off for cash, and usual abatement of 10¢ ℔ keg on carload lots and upward. As intimated in our last report, the Western Nail Association has ordered a suspension for 30 days, commencing yesterday, the 16th.

Wrought Iron Pipe.—There is an increasing demand, and prices are firmer, but unchanged. Discount on Gas and Steam Pipe, 70 and 10 % on small, and 75 %, straight, on large sizes; on Boiler Tubes, 55 @ 60 % off. Some manufacturers are indifferent about selling Pipe at present prices, which afford but little, if any, margin for profit. Oil Well Casing quoted at 45¢ @ 50¢ ℔ foot; do. Tubing, 14¢ @ 15¢.

Steel.—There have been no new features developed in the Merchant Steel trade during the past week. Business continues quiet, but hopes are entertained of an improvement in the near future, and with good prospect of being realized. On the common grades prices are still being "cut" a good deal.

Steel Rails.—For near-by delivery, say from now until September, prices are reported steady at $39, cash, at mill; for late fall or winter delivery, $38.

Old Rails.—There is some considerable inquiry for American Tees, with but very few lots offering for immediate delivery; for good lots buyers are offering $23, and 50¢ more might be obtained. Like Pig Iron, it appears to be generally conceded that bottom price has been reached.

Railway Track Supplies.—Railway Spikes are still quoted at 2.60¢, 30 days, free on cars in Pittsburgh, although it is said that sales have been made as low as 2.25¢, delivered at St. Louis. Splice Bars are still quoted at 1.9¢ @ 2¢, and Track Bolts at 3¢ with Square and 3.2¢ with Hexagon Nuts.

Scrap Ends.—Consumers here are pretty well stocked; hence, there is no demand, and in the absence of sales we quote, nominally, at $25, although some operators claim that the best foreign brands could not be put here from the seaboard to be sold under $25.50.

Scrap.—Wrought Scrap is quoted at $21 @ $22 ℔ net ton for Ordinary, and $23 @ $23.50 for Selected Railway; Old Car Axles, $32 @ $33. Old Car Wheels.—There have been no sales for some time, and it is impossible to give reliable quotations. Cast Borings, $13 @ $14, gross.

Coke remains unchanged at 90¢ ℔ ton on cars at ovens, and business is in an exceedingly unsatisfactory condition.

CHICAGO.

Office of *The Iron Age*, 36 and 38 Clark St., Cor. Lake St., CHICAGO, July 16, 1883.

Hardware.—We have nothing of importance to note in this market; trade has been fair and prices firm.

Nails.—Continue to be in good request. The mills having shut down, together with the fact that stocks, as a rule, are light, will undoubtedly maintain prices firmly. We quote 10d. to 60d., $3.05 @ $3.15 ℔ keg, according to quantity, with the usual 2 % off for cash.

Manufactured Iron.—The inquiry for Merchant Iron, considering the season, is active, and quotations are firm. We quote Bar, 2.15¢ @ 2.25¢ rates; Angle, 3¢ @ 3.2¢ rates; T Iron, 4¢ rates; Beams, 3.8¢; Channels, 4¢; Sheet Iron, 9 to 14 gauge, at 3¢ rates; 15 to 17 do., at 3.3¢; 18 to 21 do., at 3.6¢; 22 to 24 do., at 3.8¢; 25 to 26 do., 4¢; 27 do., 4.2¢. The quotations on Sheet Iron would be shaded 1-10¢ @ 2-10¢ ℔ lb on large lots. Norway Original Bars, 4¼¢ rates; Norway Rerolled Bars, 5¼¢ rates; Ulster, 4¼¢ rates; Low Moor Iron, 8¢ rates; Nuts and Washers, 8¾¢ off list; Wrought Boat Spikes, 2.9¢ rates.

Pig Iron.—A slight weakness was perceptible during the early portion of the week, but the market rallied later on, and is now firm, with an increased activity to be noted. Furnacemen refuse orders for Lake Superior Charcoal Iron for future delivery at present quotations. We note an advance on Silvery Soft of $1.50 ℔ ton, new grades of which are very scarce and in excellent demand, while Close Silvery is plentiful, but with little demand for it. Southern Irons continue fairly active, while for Imported Scotch there is a fair inquiry, with firm quotations, which we give at $27 @ $28. Lake Superior Charcoal, Nos. 1, 2 and 3, $23; Nos. 4, 5 and 6, $24.50; Briar Hill, $24; Himrod, $22.50; Crane, No. 1, $25; No. 2, $24; Thomas, $24 @ $25.50; American Scotch, $22 @ $25; Du Val, No. 1, $23.50; No. 2, $22.50; Fulton Notch, No. 1, $22.50; No. 2, $21.50; Calumet, $22 @ $23; Southern Coke, No. 1, $23; No. 2, $22.35; Low Moor, No. 1, $24; No. 2, $22.75, 4 mos.; Silvery Soft, $21 @ $23.50; Ashland (Hanging Rock Softeners), No. 1, $23; No. 2, $22, 4 mos.

Ores.—There are considerable quantities of last year's output of Lake Ore still unsold, sufficient to prevent prices advancing, notwithstanding the increasing demand. Menominee Range Hematites are offered at $3.50 @ $4 f.o.b. at Escanaba, while there have been some sales reported at considerably less.

Steel.—There has been no change worthy of note during the past week in this market; trade is rather quiet, though prices are firm. We quote Tool, 11½¢; Machinery O. H., 5¢; Crucible Machinery, 7¢; Hammer, 2 inches and under, 8¢; over 2 inches, 9¢; Cast Spring, 6¢, and O. H. Spring, Tire and Sleigh Shoe, 5¢; Sheet, first, second and third quality, 12¢, 10½¢ and 8½¢ respectively; Crucible Plow, 6¢; Eagle Plow, 5¢; Iron Center Plow, 9¾¢, and Soft Steel Center Plow, 9¾¢; Cast Plow, 5¢; German Plow, 4½¢.

Scrap Iron.—A trifle better inquiry was the rule during the week past, while quotations remain unchanged. We quote as follows, which are dealers' purchasing prices: No. 1 Country Wrought Scrap, ℔ net ton, $17; No. 1 Cast Scrap, ℔ ton, $15; No. 1 Stove Plate Scrap, ℔ ton, $10; Machine Shop Wrought Turnings, ℔ ton, $9; Cast Iron Borings, $7; Old Plows and Plow Steel, $11; Malleable Scrap, $5.

EVERETT & POST, 156 Lake street, Chicago, report to us as follows, under date of July 14, 1883: *Pig Lead.*—The market during the past week has shown some weakness, principally caused by apathy in trade (as is usual at this season). The demand is principally of a hand-to-mouth character, consumers buying only as their wants require. Sales have been made of 500 tons Common and Refined at $4.15, $4.14 and $4.12½, latterly. *Coke.*—The demand for Connellsville Foundry and Crushed Coke continues good, principally, however, from points West. Prices are firm at $5 and $5.15, according to quality and delivery.

CHATTANOOGA.

Office of *The Iron Age*, Market and 8th Sts., CHATTANOOGA, July 16, 1883.

The usual reaction after the Fourth of July celebrations is now in its full force, and still general trade is not very dull. There is considerable movement of heavy articles, owing to renewed activity in building several new lines of railroad and the heavy demands of builders for all sorts of Castings, Rails, Bolts and Heavy Hardware.

Pig Iron.—There is nothing of interest to report in the Pig Iron market except a slight strengthening of holders, especially in the higher grades. Trade is still confined to small lots, and there is no improvement in the movement of the lower and cheaper brands. We quote No. 1 Foundry, $19 @ $20; No. 2 Foundry, $18 @ $19; Gray Forge, $16 @ $19; White and Mottled, $14 @ $15; Car-wheel Metal, $24 @ $26.

Ores.—We quote 50 % Brown Hematite, ℔ ton, $2 @ $2.75; Red Fossil, $2 @ $2.25, delivered at furnace.

Miscellaneous Articles.—Old Rails continue dull at $22. The demand on shipping account is lighter. We quote Wrought Scrap, $18 @ $22; Cast Scrap, $11 @ $14; Old Wheels, nominal, $22.

Nails—Are steady at $3, large bills; 10¢ @ 15¢ more for small lots.

Manufactured Iron.—Bar Iron is slow at $2 for large lots, assorted lengths and sizes. There are abundant orders for Spikes and other Track Supplies, and rates hold up well. Spikes, $2.70; Track Bolts, $3.20; Fish Plate, $2.

Coal.—We quote Fancy Lump, $3; Common, $2.50; run of mine to manufacturers, $1.75 at mills.

Coke—Is steady at $3 ℔ ton for Furnace at point of use; Foundry, 10¢ @ 12¢ ℔ bushel.

CINCINNATI.

JULY 16, 1883.—*Pig Iron.*—During the past week there has been no change in any of the features of the market other than producers and holders of stocks are less inclined to accept present prices for late deliveries. Consumers continue to draw largely on the stocks for immediate use. While some of the largest stove foundries are shutting down for the summer, the rolling mills and machine works in this region demand larger supplies. The Iron brokers of this region are reaching out with offers to new and distant fields of Iron, made not only in the West and South, but those made in East Virginia and Maryland. Considerable drafts of a Hanging Rock Silver-Gray Softener and Fluxed Pig Iron have been and are being made by stove foundries in Cleveland, Buffalo, and down the Hudson as far as Peekskill, and from Chicago, Milwaukee, &c., which have almost entirely depleted the stock of this kind. Best Hanging Rock Charcoal Foundry is not in plentiful supply, and prices of this grade are well sustained. Quotations for the past week: Best Hanging Rock Charcoal, $24.50 @ $25; Good, $24; Southern, $20 @ $21.50; No. 2, 50¢ @ $1 less; Hanging Rock Coke, Best, $21.50 @ $22; Good, $20.50 @ $21; No. 2, $1 less; Southern, No. 1, $20; No. 2, $19; No. 3, $18; American Scotch, No. 1, $21.50; No. 2, $20.50; Silver-Gray Softener and Fluxers, No. 1, 20.50; No. 2, $19.50; No. 3, $18.50; Forge Irons, $17 @ $22.50, including all grades Stonecoal, Coke and Charcoal. No sales Scrap Rails or Wheels reported to enable quotations.

LOUISVILLE.

GEO. H. HULL & CO., Commission Merchants, report as follows, under date of July 14, 1883: The market is quiet, with moderate sales. We quote, for cash, in round lots as below:

FOUNDRY IRON.	
No. 1 Hanging Rock Charcoal	$25.00 @ 26.00
No. 1 Southern Charcoal	22.00 @ 23.00
No. 1 Hanging Rock Stonecoal and Coke	20.50 @ 22.00
No. 1 Southern Stonecoal and Coke	20.00 @ 20.50
No. 2 " " "	19.00 @ 19 50
"American Scotch"	19.00 @ 20.00
Open Silver-gray	18.00 @ 19.00
Close "	17.50 @ 18.00
MILL IRON.	
No. 1 Charcoal	19.50 @ 20.00
No. 1 Stonecoal and Coke, Neutral	18.00 @ 18.50
No. 2 " " "	17 00 @ 17.50
No. 1 " " Cold-short	17.50 @ 18.00
No. 2 " " "	16.50 @ 17.00
White and Mottled, Cold-short and Neutral	15.50 @ 16.00
CAR WHEEL IRONS.	
Hanging Rock, Cold-blast	32.00 @ 35.00
" Warm-blast	25.00 @ 27.00
Alabama and Georgia, Warm and Cold-blast	27.00 @ 28.00
Central Kentucky, Cold-blast	25.00 @ 28.00

W. B. BELKNAP & CO., Iron and Steel Merchants, Nos. 115 to 121 West Main street, report to us as follows, under date of July 14, 1883: While a general decline in values all over the country manifests itself, while provisions in Chicago and stocks in New York have been tumbling despite statistical positions, it is hardly to be expected that Iron would improve. *Bars* show no signs of betterment. They are moving possibly in larger quantities than a fortnight since, but the production is so boundless that no diminution of supply is yet apparent. In the endeavor to meet low quotations any quantity of wretched Iron has been put upon the market. The consumers are beginning to discover the poor economy of using bad stock, and are calling for a better grade of Bars, warranted at least to do ordinary work. *Hoop.*—The formal drop by the Western Hoop Association of $4 ℔ ton is significant of the state of the market and a forcible recognition of the dullness we have been reporting. Demand, however, has not improved, and Bar mills are still quite willing to take Bands in at new price as an offset to excessive Bar in assorted orders. *Sheet* is quiet. There seems, however, no disposition to cut the prices that have been ruling for two weeks past. *Nails.*—At last there seems to be a *bona fide* movement on the part of the manufacturers to close for a month. Had they continued in full operation, the price would have gone down in short order to probably between $2.25 and $2.50. As it is, the market is firm and demand slightly improved. *Fence Wire*—Much depressed, and lowest prices yet quoted prevail. The only changes to note are those in which we follow the Eastern market—55 % instead of 50 % as initial discount on *Screws*, and an advance in leading makes of *Files* of 10 %. The latter are very strong, and this is extremely encouraging as the solitary and illustrious example of an advance in the midst of a general decline. *Hinges* are very low, and much other Hardware apparently near bottom. As an index of prices here we might mention that the Central Coal and Iron Co., of this place, secured the contract for fine Coal for the Exposition at 3½¢ ℔ bushel. This must be cheaper than water power. Farm products are coming in freely. New potatoes retail at $1.25 ℔ barrel, so that along with low prices for manufactured goods we are assured of cheap food.

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of July 16, 1883: We have to report a fair to moderate trade doing for the past week. Values continue ruling shaded and weak at annexed figures:

Ref. Bar Iron, 1 to 6 x ¼ to 1	℔ lb	2½ @	2.35¢
" " 1 to 4½ x 1½ to 1	℔ lb	2¾ @	2.35¢
" " ¼ to 2, Round and Square	℔ lb	2¾ @	2.35¢
Hoop Iron, 1½ wide and upward	"	3 2-10 @	3 3 10¢
Band Iron, from 1½ to 6 in. wide	"	2 7-10 @	2 8-10¢
Horse-shoe Iron	"	3¾ @	3¾¢
Norway Nail Rods	"	5¾ @	5¾¢
Black Diamond Cast Steel	"	11 @	12 ¢
Machinery Steel	"	4½ @	5 ¢
Spring Steel	"	4 @	4½¢
Common Horse Nails	"	10 @	11 ¢
Railroad Spikes, 5½ x 9-16	"	2 6-10 @	2 7-10¢
Perkins' Horse Shoes, ℔ keg of 100 lb		$4.	3½
" Mule Shoes		5.	37½

R. C. HOFFMANN & CO., Pig and Railroad Iron Merchants, No. 21 South Frederick street, write as follows under date of July 16, 1883: We have no material change to note in the Iron market. No. 1 Foundry is scarce and firm at quotations, while Mill Irons are weak. C. B. Charcoal Wheel Irons are in fair demand. Prices are ruling about as follows:

Baltimore Charcoal Wheel Iron (all Baltimore Ore)	$28.00 @ 30.00
Virginia C. B. Wheel Iron	28.00 @ 30.00

Anthracite, No. 1	22.00 @ 23.00
" No. 2	20.00 @ 22.00
" No. 3	17.00 @ 18.00
" Mottled and White	15.00 @ 16.00
Charcoal C. B. Blooms	50.00 @ 55.00
Refined Blooms	40.00 @ 45.00

ST. LOUIS.

HOFFER & Co., Pig Iron and Iron Ore Merchants, 214 Pine street, report to us as follows, under date of July 14, 1883: The market remains unchanged.

HOT BLAST CHARCOAL IRONS.

Missouri	$20.00 @ 21.50
Southern	20.00 @ 21.00
Ohio	25.00 @ 26.00

COAL AND COKE IRONS.

Missouri	20.00 @ 20.50
Southern	18.50 @ 20.00
Ohio	20.50 @ 25.00

MILL IRONS.

Red Short	18.50 @ 20.00
Neutral	17.00 @ 18.00

CAR WHEEL AND MALLEABLE IRONS.

Missouri	21.00 @ 22.00
Southern	25.00 @ 28.00
Ohio	23.00 @ 32.00

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From Our Regular Correspondent.)

LONDON, ENG., July 2, 1883.

THE WEEK

has been unproductive of matter of much moment from a standpoint likely to interest your readers, although it seems just probable that causes are at work in the iron trade which may presently give specific results. At the moment, however, everything is very quiet, and the end of the quarter has brought even less new business than is usual at similar junctures. The half year has also come to an end, and not a few of our manufacturers are utilizing the present dullness in order to take stock, in a metaphorical as well as in a literal sense. Literally, the stock-taking will occupy two or three weeks, or even more at some of the larger works, where the hot period is best utilized in this manner. Metaphorically, the mental stock-taking, so to speak, need not occupy many minutes, inasmuch as it merely represents the summing up and formulation of opinions and deductions accumulated during the past six months. Generally speaking, this summing up on the present occasion is not universally of a satisfactory nature. The turnover has been large in many cases, but profits have been most meager, and there are plenty of works which will be well satisfied if they have made no loss upon the transactions of the first half of 1883. Competition was never keener than it has been these two or three months past, and the prices actually realized—not those openly quoted or spoken about—have been lower than has ever been known in many branches of the British iron trade. All sorts of expedients have been adopted with the view of obtaining orders and retaining old customers, some of which expedients are not unlikely to give trouble subsequently. Economies not dreamed of in the philosophy of a few years ago have been embodied in every-day practice, and hard driving has become a part of the regular routine of diligent furnace, mill and forge managers. In crude irons prices have been lower than for two or three years past, even in the open market, and there are good reasons for assuming that bottom figures have rarely been allowed to transpire. Some kinds of heavy manufactured iron have sold freely and at fair values, especially ship plates, the large output of which has enabled profits to be secured which would have been wholly non-existent with a smaller rate of output. Engineering and structural irons, too, have sold well and have given remunerative returns. Ordinary merchant iron has been dull, and I fancy has not been profitable, excepting sheets during the first quarter. Bars have certainly hung fire all along, and if they have not been sold at a loss in numerous instances, it has been for reasons best known to the puddlers and rollers. Therefore I have run lightly over somewhat pessimistic ground.

I may now enliven the picture by stating that in many of the steel-trade departments and in the thousand and one branches belonging to, but not strictly within, the iron and steel trades, very respectable results indeed have been attained since the 1st of January last. There has been plenty of grumbling in these sections, yet I happen to know that much of this complaining has been what is emphatically styled "foxing," and has been merely intended to cloak the operations of the individual from the too eager and covetous gaze of others. I do not think the device has been invariably successful, especially in the cases of isolated works, but in a general way it may have had its uses. Striking a rough average, I think we may assume that the first moiety of 1883 has been a poor one for many of the members of the iron trade proper, while it has given at least average results to those who are outside the circle of the iron producers pure and simple. I have the honor of counting sundry gentlemen in these branches among my acquaintances and friends, and I am happy to learn that most, if not all, of them believe that their "returns" for the six months will be equal to those of the corresponding period of 1882, or maybe a trifle ahead. I don't think these instances are exceptional, but, rather, that they prove the rule. Going yet further afield, I may confidently assert that there are several departments in which the activity of 1883, up to the end of June, has been altogether without precedent. This has been the case more particularly in the engineering trades, the majority of the shops in those branches having had the fullest possible occupation since Christmas. The locomotive builders began the year well and are still much behind their orders, which are not only on home account, but also for France, Spain, Italy, Holland, Egypt, Turkey and many of our own Colonies. Two or three shops have their books filled with foreign orders, which will keep the works going for another 12 months, while other concerns have orders at their disposal whenever they like to take them in hand. The best part of a good deal of the foreign work is that it is virtually non-competitive. Some of the foreign railways will have English locomotives irrespective of price—within certain defined limits, of course. In Holland, for instance, one sees Beyer & Peacock's or Sharp, Stewart & Co's, engines everywhere, and in Belgium the same thing is observable, albeit on a small scale. From France alone we have now in hand orders for over 100 locomotives. Some of these orders may possibly be influenced, I admit, by the fact that many of the older lines of railway on the Continent of Europe were made and are still largely owned by British capitalists, besides having offices in London, where much of their rolling stock, &c., is purchased. The fact, however, is just the same, and it is a matter of supreme indifference to our engineering firms how or why they get the orders, so long as they do obtain them. Then, again, there are the agricultural engineers. These concerns (as I have recently mentioned in this correspondense) are completely choked up with work, many of them being months in arrear with their deliveries. They are running full time, and are turning out more engines and machinery than at any former juncture. These firms represent our best practice of its class, and their engines, &c., will compare most favorably with any thing the whole world produces. As a natural outcome their manufactures are always in demand, and, what is more curious, the call seems to grow larger every succeeding year. From, Russia, Hungary, Roumania, Bulgaria, &c., the demand is practically illimitable, and taxes all the powers of those engaged in the business. I heard the other day of a single agent in an obscure town of South Russia having sold in a year nearly 100 sets of threshing machinery, at about £450 to £500 a set, for one English house, while at a certain Continental exhibition the other day I myself heard inquiries for other large lots, coupled with complaints of the difficulties experienced in obtaining deliveries from English makers. It is thus evident that these manufacturers are fully occupied, and that they still "rule the roost" in their particular line. Their profits may not be commensurate with their turnover, but there is no good reason for assuming that they are working at a loss. They are, at all events, among the best equipped, best organized and most intelligent of our engineering houses, and their successes have only been attained by an amount of enterprise which has been most spirited and world-wide in its ramifications. In hardware I am not in a position to generalize quite so broadly as to the proceedings of the half year. I know of numerous houses which have done well in spite of the drawbacks of these hard times, while I also am aware that many other firms have had hard work to make both ends meet. On the whole, nevertheless, I fancy that matters may be classed as having been moderately satisfactory, although it goes without saying that customers are very "long-winded," and money is extremely scarce in the country districts. Some of the export markets, such as the Cape of Good Hope, have been badly disorganized or overstocked, and bad debts have been numerous, yet, on the whole, it is a fair assumption that business in hardware has been tolerably remunerative. I commenced this section of my letter under "The Week," whereas I find I have devoted most of my remarks to the past six months. Let me now endeavor to repair the omission by stating that "the week" has been very much like the "snakes in Ireland"—viz., there has been nothing in the week worthy of special remark save the weather. The weather, as you are doubtless well aware, is claimed to be a peculiarly British institution. You may have your sort of weather, the French theirs, and so on through the whole gamut, but *our* weather is an article specially prepared for home consumption, and is the only product we have failed in making a part of our export trade. The weather, then, of the week or ten days past has been splendidly fine—very hot, and only broken by local thunder storms in different parts of the country. These storms have in some cases been accompanied by hail (it is singular that hail rarely or never falls in or near forests or large woods), which has done more or less damage to the fruit and cereal crops; yet, on the whole, the farmers have had a good time, and are getting in their hay in fine condition. On the Continent most of the grass crops are heavy and the hay has been well got, and the remark has a wide application in England. The cereals are also looking well, while the showers have benefited the root crops hugely. The agricultural outlook is thus promising, and has not any drawback worthy of mention. To-day again is very hot—83° in the shade.

THE IRON MARKET

has been quiet all round, with Scotch warrants at 47/ @ 47/1½ after a speculative advance to 47/4 early last week. Makers' brands are easy and somewhat nominal at rates given elsewhere in this letter. Stocks continue to increase, although the shipments are good and the local consumption is said to be maintained; hence, it is assumed that the make is still too large. No movement has been initiated in the direction of restriction, however, albeit the Cleveland ironmasters are still discussing their own arrangement to that effect. In some quarters it is held that the restriction is likely to be abandoned as having become practically inoperative. Meantime, No. 3 is 39/ @ 39/6 in the face of very large exports, a strong Scotch demand, and a heavy local consumption. On the West Coast hematite pigs are dull and nominal at 49/6 @ 51/ ℔ ton for mixed numbers, but with rumors that as low as 49/ has been accepted in one or two sales by second holders. The production is being gradually reduced, there being now only 53 out of 82 furnaces at work. Elsewhere all grades of pig iron are dull and weak, and sales are of no account. Heavy manufactured iron is still in large output, but transactions in the open market are of limited proportions. For armor plates, however, large commissions from Russia, &c., have been secured, while the boiler and shipplate mills have an abundance of work in hand as well as on hand. In all kinds of merchant iron business is sluggish for the moment, pending the holding of the quarterly meetings next week. Manufacturers are earnestly trying to uphold values, or even to advance them, yet there seems to be little or nothing in the demand to warrant an advance. Sheets may perhaps form an exception to this rule, the galvanizers and other consumers of black sheets having come into the market as large buyers. Doubles may be called £8. 5/; singles, £7. 10/, and trebles, £8. 15/ and upward. Orders are said to have been declined in some cases at late rates. For hoops, too, a little more money is being asked, although users are not willing to close at higher rates. Bars run from £5. 10/ for ordinary Welsh to £7. 10/ for Staffordshire, marked sorts—Cleveland, Lancashire, &c., being intermediate both as regards quality and price. While referring to the condition, &c., of the English iron trade, it may be of interest to note the following expressions of opinion by Mr. J. D. Ellis, the chairman of John Brown & Co., Limited, Sheffield. That gentleman, in addressing the annual meeting of shareholders last week, said that although his sanguine anticipations of the past year had not been realized altogether, there had yet been some improvement in the business done. The directors had long held the opinion that the manufacture of steel rails in Sheffield must eventually be abandoned, and their wisdom had been justified in laying out their capital in other branches of manufacture. There was now, he believed, only one concern that made steel rails in the district. Alluding to the armor-plate department, he said although it had not been employed to the extent of its output, yet there had been considerable activity during the past year. The present state of the iron trade was about as bad as he had ever known it; but there were some indications of a better state of things, and, without venturing to prophesy, he trusted that by this time next year the directors would not, at any rate, have a worse report to lay before the shareholders.

At the meeting of the Darlington Steel & Iron Co., Limited, the chairman (Mr. T. Hugh Bell) said: "What the next few months of the trade might bring forth no one could tell. With regard to the low price of steel rails, the situation at present was not a very brilliant one, but, at the same time, it was not unbearable, and if it did not alter for the worse they might hope to hold their own." Steel rails are nominal at £4. 15/ or 80; crop ends, 57/6 @ 59/; old leaf spring steel, £4. @ £4. 5/; old rails and heavy wrought scrap, nominal.

SCOTCH PIG IRON

has been a shade uneven since the date of my last report, but in the main has been quiet and devoid of new features of importance. There were rumors early last week of the receipt of considerable orders for Scotch pig from the United States, which rumors were promptly and smartly utilized by the speculators for a rise, but the thing proved very much of a "fizzle," and the American orders proved to have been of very moderate size. The spurt of 3d. or 4d. in warrants was lost, consequently, and the week closed at lower rates. It may be noted that warrants at Glasgow are now 47/ @ 47/1½, against 49/2½ this date last year, when the stocks in Connal's stores amounted to 636,537 tons, as compared with 584,402 tons now. Last week only 145 tons were added to the reserve stocks. Scotch shipments to date have been 301,473 tons this year, as compared with 299,702 tons last year same date. Imports of pig iron into Scotland from Middlesboro' have been 132,314 tons, against 106,092 tons last year. There are now 114 furnaces at work in Scotland, against 108 a year ago. Writing from Glasgow on June 29, James Watson & Co. said: "The Scotch pig iron market has been the turn firmer this week, warrants fluctuating between 46/11½ and 47/2½, cash. On Monday business was done from 47/1 to 47/2½, and back to 47/1, and on Tuesday prices were from 47/½ to 46/11½, and up to 47/½, cash. On Wednesday the market was steady between 47/½ and 47/1, and yesterday transactions took place at 47/½ and 47/. To-day prices were firmer from 47/½ to 47/2, cash, closing sellers at the latter. There has been more business doing in shipping parcels last week, several orders having been placed for the States, but prices remain, on the whole, unchanged. The shipments last week were 14,347 tons, as compared with 15,324 tons for the corresponding week of last year." We quote:

	No. 1.	No. 3.
G. M. B., at Glasgow	48/	46/
Clyde, "	50/6	48/6
Coltness "	59/6	53/
Langloan, "	39/6	53/6
Gartsherrie, "	57/	53/
Summerlee, "	57/6	50/6
Calder, "	58/	50/6
Carnbroe, "	54/6	49/
Glengarnock, at Ardrossan	54/3	47/6
Eglinton, "	48/	45/6
Dalmellington "	48/6	47/6
Shotts, at Leith	59/	55/
Kinneil, at Bo'ness	49/6	47/6
Carron, at Grangemouth	49/	47/6

MIDDLESBORO' PIG IRON

is also quiet, on the basis of 39/3 @ 39/6 as the general price of No. 3 pig iron. The Cleveland ironmasters have fully discussed the question of further restricting the make, and have arrrived at a tentative decision which virtually means they will not blow out any more furnaces, but does not quite settle the crucial point of continuing or ceasing the present nominal restriction. G.M.B., f.o.b. at makers' wharves in the Tees for net cash, less 2½ %, are quoted:

No. 1 Foundry	43/6	Mottled	38/
" 2 "	41/6	White	37/6
" 3 "	39/6	Refined Metal	55/
" 4 "	39/	Kentledge	40/
" 4 Forge	38/6	Cinder	34/

Shipments during June are expected to count over 90,000 tons. The men at Bolckow-Vaughans are working pending the decision of the arbitrator. The Walker Iron and Steel Works Co., Limited, on the Tyne, have decided to close their works and cease manufacturing, owing to the current low prices of ship plates and other finished iron.

WEST COAST HEMATITE PIG IRON

is without any alleviating feature, and is very slow of sale, even at the low values proffered by merchants, some of whom are willing to accept 49/ for mixed parcels of Nos. 1, 2 and 3, but the general quotation ranges from 49/6 to 51/, makers' being highest. For makers' brands the following are the rates current for ordinary parcels—large lots might be shaded:

	No. 1.	No. 2.	No. 3.
Cleator	54/	53/	52/
Lonsdale	51/	50/6	50/
Workington	51/	50/6	50/
Lowther	51/	50/6	50/
Distington	51/	50/6	50/
Harrington	51/	50/6	50/
Solway	51/	50/6	50/
Maryport	51/	50/6	50/

There are 53 furnaces at work, and in the West Cumberland stores 53,707 tons. Last week's shipments included 13,940 tons of pig iron and 11,563 tons of steel rails, &c. Cumberland ores are being stocked at the mines; they are quoted 10/ @ 12/, and Furness ores 9/ @ 11/6 at the mines, while Spanish 54 % ores are without sale at 14/ @ 15/, ex-ship.

TIN PLATES

are almost devoid of noticeable features, the course of the trade being evenly dull. The agitation on your side for heavier duties on British tin plates is being watched with some interest, especially by the smaller men in Wales, many of whom are mere men of straw. There is a certain apprehension that the present movement is likely to be attended with greater success than former commotions of a similar kind. From Liverpool a little more business is reported in terne plates, while other information is to the effect that all the reputable manufacturers are well booked ahead and firm in their views. General rates may be called 16/ @ 16/6 for ordinary cokes, 18/ @ 19/ for ordinary charcoals and 19/6 @ 21/ for ordinary best charcoals, all in Liverpool.

FOREIGN.

FRANCE.

(Moniteur des Interets Materiels.)

PARIS, July 1, 1883.—*Metals.*—The business prospect generally and in Metals in particular continues encouraging. In *Copper*, Chili Bars have slightly improved and now command in francs ℔ 100 kg., 165 @ 170; Ingots and Slabs, 172.50; Best Selected, 176.25, and Pure Corocoro Ore, 168.75, whereas, *Tin* is lower, Banca being worth 257.50; Billiton, 253.75; Straits and Australian, 252.50, and English, 250. *Lead* has improved to 32 @ 33, but *Spelter* has dropped to 30.75 @ 40. *Iron.*—The Iron market remains unaltered in this city. It is feared that when the orders for railroad material shall be given, under the arrangement between the Government and the leading companies, they will be in excess of the capacity of our makers, coming, as these orders will, all in a heap, and that a great deal will have to go abroad to be filled. Meanwhile the quotation here is for Merchant Iron, 18 francs ℔ 100 kg.; ditto Charcoal, 25; Flooring Iron, 18; Sheets, 23 @ 26, and Wire Nails, No. 18, in bulk, 27. At the North, the position of Iron remains the same—that is to say, the market is heavy; Merchant, 17 @ 17.50; Sheets, 21, and Horse Shoes, 33. In the Haute-Marne, Merchant Iron is quoted 19 @ 19.50, and No. 3 Pig, 8.70; a quiet feeling prevails. There is some complaint from the Loire basin, a few railroad material orders expected to be filled in the district having gone abroad; but for Italian account, on the other hand, the Terre Noire Co. filled some Sheet Iron orders at 29 francs ℔ 100 kg. At the South, at Balaruc, a Paris capitalist has purchased the blast furnaces. All we can say is that although things are as yet quiet in France in the Iron line, the outlook is highly encouraging, so that in a week or two we hope to be able to report an active market and improving tendency. *Coal* is unchanged, but great activity is displayed to get off as much as possible before low water inland puts a stop to canal navigation. The output is steady in the Loire basin and at the South at well-sustained figures."

BELGIUM.

(Moniteur Industriel.)

BRUSSELS, July 2, 1883.—*Iron.*—The uncomfortable state of affairs hitherto referred to still prevails; it is difficult to see how we shall get out of the crisis we are passing through. It is true there are more inquiries, but they most of them result in so very little actual business that the latter does not suffice to improve rates. English Pig Iron is still quite weak at 5.75 francs ℔ 100 kg., while Charleroi Foundry Pig sells at 7, and Athus-Halanzy at 6. Puddling do. is with difficulty upheld at 5.75, certain blast furnaces in Luxembourg having thrown on the Belgian market all their surplus stock at a figure equal to 5.70 francs deliverable at Charleroi; between Belgium and Germany their average at the works is still sufficiently large to leave them a good profit, because they belong to the German Customs' Union, and sell 80 % of their output there. This selling out of the Luxembourg people at least does away with their competition among us for some time to come, but, at any rate, these occurences again demonstate how favorably Luxembourg is situated between the two countries. Common Puddling we quote 4.75 @ 5.25. Merchant Iron begins to be held with greater firmnes at 12.50 francs, with 1 franc difference between numbers. Beams command 13 francs ℔ 100 kg., and Corners, 13.50. Sheets sell slowly at 17 francs, No. 2; 19, No. 3; 21, Commercial; 25, Thin, and 27, No. 4. *Coal.*—The Coal situation remains tolerably sound, notwithstanding a slight giving way in one or two species. Since the French Government has come to a conclusion with the great railroad lines there, it is believed that Coal in Belgium is going to be benefited thereby. Meanwhile manufacturing activity in Belgium generally, outside of the Iron line, is satisfactory, keeping up a good Coal demand. Even domestic Coal is very firm, although this is the dullest season for it. *Coke* sells at 15.

GERMANY.

(Borsenhalle.)

HAMBURG, July 3, 1883.—*Iron.*—Since our last report the Iron situation in Germany has slightly improved; at least the downward tendency in Puddling Pig has been decidedly arrested. In Upper Silesia the demand for such has become livelier, but without so far leading to a rise. Merchant Iron, on the other hand, remains neglected and easy. Sheet Iron enjoys a good demand; work abounds at all Steel works. The latter, like the Luxembourg Pig Iron makers, place part of their product abroad if English and Belgian competition permits them to do so, but are compensated by selling at comparatively high prices within the Customs' Union, so that between the one and the other the result of their labors is satisfactory. Rolled Wire still remains dull, but other kinds of Wire are rather better. Hardware manufacturers, machinists and founders have plenty of orders on hand to last them for some months to come, and so have the makers of Metallic Cloth. In several large cities, particularly at Berlin, there is a great deal of building going on despite the decline in rents; this is chiefly due to the greater activity in industry and general business, and to the endeavors on the part of land-lords to build houses and cottages replete with modern comforts and thus likely to rent better. Furthermore, the fine crop prospects hold out hopes of a good fall trade encouraging to enterprise. It is to be presumed that the Iron situation will soon be benefited by these influences at work. Meanwhile *Metals* remain quite dull. We quote: Lead—German Pig, 13.25 @ 13.50; English, 14.50 @ 15; Copper is a little firmer at 71 @ 78, the latter for Lake; Tin is in better request at 105 @ 108, but Spelter without anything doing, 15.25 @ 15.75; all in marks ℔ 50 kg.

(Wirth & Co.)

FRANKFORT-ON-MAIN, July 1, 1883.—*Mineral Oils.*—It is not to be presumed that there is going to be a permanent decrease of Petroleum production in the United States; it may occur later on, but is not likely now. Hence, after a good many fluctuations, prices are likely to return to a normal level, the more so as in a good many localities, such as California, Mexico and Brazil, new and promising territory is just at present being opened calculated to cover the steadily-growing consumption, not to speak of the competition of Russian Oil with American, which is quite successful where the difference in freight militates in favor of Petroleum from the Caucasus. *Lubricating Oils* from the latter province show a notable improvement in quality.

GREECE.

(Mining Review.)

LAURIUM, July 2, 1883.—*Lead and Spelter.*—The report read at the general meeting of shareholders shows that the net profit for the fiscal year, ended June 1, has amounted to 1,698,365 drachmæ or francs, out of which the Laurium Mining Co. have declared a dividend of 45 francs per share. The product has been 45,465 tons of Crude Calamine, 41,300 tons of Lead Ore, and 12,600 tons of Zinc and Lead Ore mixed. The production of Calcined Calamine has been 33,528 tons. The smelting works turned out 1921 tons of Lead, with an average Silver contents of 2000 grams ℔ ton. The railway is in operation since March 28 last; it cost 974,457 francs to build the same. Total shipments of Ore, 48,149 tons. The amount of 511,504 francs has been spent in sinking new shafts. The company shipped to the Escombrera-Heiberg Co. during the year 10,000 tons of mixed Ores; to the Marseilles Co., 1876 tons of Pig Lead and 1371 tons of Lead Ore.

HOLLAND.

(Koch & Vlierboom.)

ROTTERDAM, July 3, 1883.—*Tin.*—The market, though firm, has been quiet at 57 guilders ℔ 50 kg. Billiton, spot, and 58 September delivery, while Banca, spot, is offered at 58.25. Total deliveries of Banca Tin in Holland during the first six months have been 61,886 Slabs, against 68,613 in 1882, and 78,650 in 1881. Visible supply July 1, 147,125, against 117,892 and 110,525; Billiton deliveries, 47,166, against 47,369 and 55,480; visible supply, 105,513, against 276,281 and 90,234.

AUSTRIA.

(Austrian Trade Journal.)

VIENNA, July 3, 1883.—*Iron.*—The demand for Merchant Iron has been rather slacker, but the deliveries have meanwhile continued large from previous orders. A good current of orders is kept up in Sheets, especially for building purposes. Hardware might be more active, but it is to be supposed it will become so in a month or two in consequence of good crops, which always influence the demand for it, for tools and agricultural implements, very much. Some disappointment is felt at the slight export demand for these articles just at present. *Pig Iron* shows great firmness. We quote in florins per ton: White Pig, 51 @ 53; Gray do., 54 @ 57; Bessemer do., 57 @ 59; Merchant, Styrian, 130 @ 131; Bohemian, 115 @ 120; do. for locksmiths, 180 @ 185; for roofing, 190 @ 195; for boilers, 175 @ 185; for tanks, 170 @ 175, and beams, 140 @ 145. *Metals* have been quiet and rather depressed, especially Copper and Tin. There has been some demand for Spelter at irregular prices. Lead remains quiet, but steady.

CHILI.

(Weber & Co.)

VALPARAISO, May 14, 1883.—*Copper.*—In sympathy with the decline in London, there has been a steady retrograde movement in prices precipitated, if possible, by the tendency in the exchange market. Sales during the fortnight 22,024 quintals at $17.85 @ $18.75. *Nitrate* has been dull at $2.35 for 90 %; buyers are discouraged by cable news, and holders show little disposition to meet their lowered views. Sales 234,000 quintals. There were chartered 15,500 tons for Europe, and 3500 for the United States. Although prices have been tending downward, the output has increased to reduce expenses.

EXPORT DURING THE FIRST FOUR MONTHS.

	1881. Quintals.	1882. Quintals	1883. Quintals.
To the North of Europe	1,601,633	2,211,654	3,305,296
To the Mediterranean	8,901	74,517	67,851
To the Atlantic U. S.	260,059	742,320	44,385
To California	44,000	83,945	88,786
Total	1,914,593	3,112,436	3,506,318

Coal.—Decreased shipments this way begin to be felt. Australian sold at 32/ to arrive; no English offering. *Exchange*, 34⅞d.

MEXICO.

(La Libertad.)

DURANGO, July 4, 1883.—*Tin.*—The first ton of Tin from the mines located between this city and Chihuahua has been shipped to the United States. These mines are worked by American capitalists, under the supervision of an experienced Australian Tin miner, and are of great promise. The yield of Ore is asserted to be 73 %.

EAST INDIES.

(Schmidt, Kustermann & Co.)

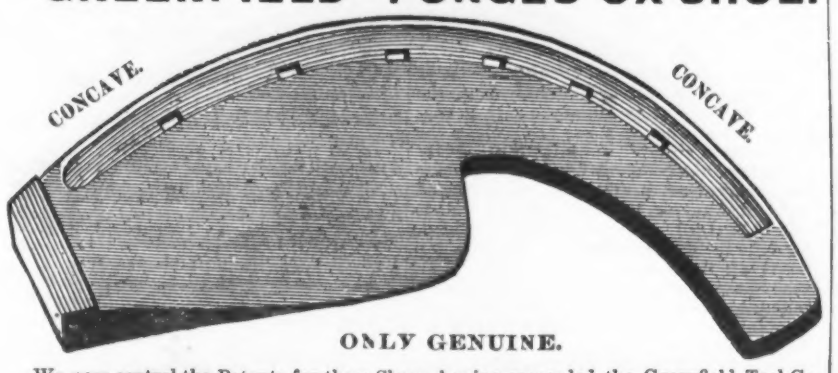
PENANG, June 2, 1883.—*Tin.*—The market opened on the 18th ult. at $30.36, and gradually rose under a good demand for China to $30.75, but subsequently receded to $29.60, in order to wind up at $30.09½. The receipts have been 7000 piculs, of which Europeans took 2000 and Chinese 5000. *Exchange*, 4 months' sight, bank, 3/8⅝.

The Explosion at Kutztown.

A terrible boiler explosion occurred at the anthracite-iron furnace of the Philadelphia and Reading Railroad, at Kutztown, on the morning of the 17th. At 4 o'clock the inhabitants of the place were aroused from their slumbers by a rumbling sound like that of an earthquake. This was followed a second later by a shock that was strong enough to knock people from their feet. People at once proceeded to the furnace. It was found that one of eight boilers walled in there had exploded, with terrible destruction to life, limb and property, and the others were thrown around. The furnace is operated by Messrs. William M. Kaufman & Co., and the casting hour was 4.30 a. m. Just before the final preparations were made, the men went outside to get some fresh air. Suddenly a terrible noise of escaping steam was heard, and the next instant the boilers were lifted with a crash and the furnace was a wreck. Large portions of the boilers were thrown long distances, and the air was filled with flying *débris*, among which were the mangled and lifeless remains of the workman. One large piece of boiler iron was sent flying through the air, and landed nearly a quarter of a mile from the boiler-house. The stock-house of the furnace, the boiler-house and adjoining buildings were torn to splinters, and never was a scene of such indiscribable confusion witnessed. When the people of the borough arrived they at once made strenuous efforts to remove from the wreckage the men that were buried beneath it, and it was found that by almost a miracle but one man was killed outright. Four others were fatally injured, and many others sustained serious injuries. The only man killed was Franklin Waltman, 21 years of age. He was at the door of the boiler-house when the explosion occurred, and was covered by a red-hot boiler that fairly roasted him to death. He was fearfully lacerated, and his body, limbs and head were a charred mass. The damage to the property will amount to many thousands of dollars. The seven boilers that were thrown out of position by the explosion were badly damaged. The furnace will have to be entirely rebuilt.

Four hundred men are thrown out of work by a fire which destroyed the shops of the New Haven Rolling Mill Co. on the 15th. The loss to the company in buildings and machinery is about $50,000. The fire broke out over the annealing boxes. It could have easily been put out when discovered, but no water was to be obtained. The city water company had cut off the water supply to the mill in order to make repairs to the mains.

"GREENFIELD" FORGED OX SHOE.



ONLY GENUINE.

We now control the Patents for these Shoes, having succeeded the Greenfield Tool Co. in their manufacture and sale. Recent decisions of the United States Court have sustained the validity of these patents, giving us exclusive right to make Concave Ox Shoes. We believe them to be the best and best-selling shoe in market, and offer them with the fullest guarantees. With our facilities we can fill large orders at short notice, and are now ready to do it.

No. 1, Full Length, Concave, 5 inches, Weight, per Set of Eight Shoes, 3 pounds.
" 2, " " 5½ " " " " 3½ "
" 3, " " 6 " " " " 4 "
" 4, " " 6½ " " " " 5 "

Packed in boxes or kegs of 100 pounds, half each rights and lefts. Full weight, and no charge for packages.

PRICES.

For orders of 1 ton or more.....11 cts. per pound.
" 1000 lbs. or more.....11½ " "
" 500 " " .....12 " "
" less than 500 lbs.....12½ " "

Terms, Net Cash, 30 days.

MILLERS FALLS CO.,

74 Chambers Street, New York.

FACTORY, - - - - - - - Millers Falls, Mass.

CHAMPLAIN

Forged Horse Nails.

MANUFACTURED BY THE

NATIONAL HORSE NAIL CO.,

Vergennes, Vermont.

HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST NORWAY IRON AND WARRANTED.

WAREHOUSE

97 CHAMBERS AND 81 READE STREETS, NEW YORK.

DURRIE & McCARTY, Sole Agents.

Armstrong's Improved Adjustable Stock and Dies

FOR PIPE AND BOLTS.

Tapped to the U. S. and Whitworth Standard Gauges. *Adjustable* to all variations in the size of fittings. Can be *resharpened without drawing the temper* by simply grinding them. Possessing practical advantages appreciated by all mechanics. Circular and Price List sent free on application.

Manufactured by F. ARMSTRONG, 30 Sterling St. Bridgeport, Conn

Iron Shingles. Double Cap, Corrugated, Crimped, Bead.

MOSER & THOMPSON, Manufacturers of

IRON ROOFING AND SIDING.

Send for Circular and Price List No. 28. | 28-32 River St., Cleveland, O.

NORTH BROTHERS,

23d & Race Sts., PHILADELPHIA, PA.,

HARDWARE MANUFACTURERS.

LIGHT CASTINGS A SPECIALTY

THE HENRY B. NEWHALL CO., 108 Chambers St., New York, and 47 Pearl St., Boston (J. H. Work, Manager), Sole Agents.

SOLE MANUFACTURERS OF THE

"WEED IMPROVED" BORING FAUCET,

For Molasses, Oil, Japan, Varnish, &c.

UNQUESTIONABLY THE BEST

LEMON SQUEEZERS

IN THE MARKET ARE THE

Nos. 1, 2 and 3 "King" for

FAMILY, RESTAURANT AND HOTEL USE,

Send for descriptive circulars.

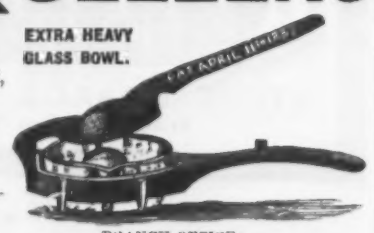
KYSER & REX,

(Variety Iron Works.)

Manufacturers of

HARDWARE SPECIALTIES, IRON TOYS, NOVELTIES AND HOUSE FURNISHING HARDWARE.

EXTRA HEAVY GLASS BOWL.



MAIN OFFICE AND FACTORY: FRANKFORD, Philadelphia.

BRANCH OFFICE: 11 North Fourth St., Philadelphia.

RIVETS

EXACT SIZE

ALL KINDS OF MACHINE

CLARK & COWLES - - - - - - - Plainville, Conn.

A. E. DEITZ,

(Successor to Barnes & Deitz)

DURRIE & McCARTY, Agents,

97 Chambers & 81 Reade Sts., New York.

SOUND DEADENED

IN FLOORS AND WALLS OF

FACTORIES,

STORES,

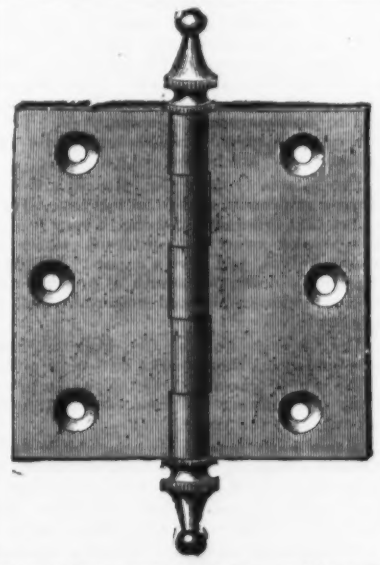
AND DWELLINGS,

By the Fire-Proof Material Called Mineral Wool.

The POOREST CONDUCTOR of heat yet offered. CHEAP and DURABLE. Sample and circular free by mail.

U. S. MINERAL WOOL CO.

22 Cortlandt St., New York.



CAST BRASS BUTT HINGES,

Polished and Plain Finish,

Manufactured and kept in stock by

W. & J. TIEBOUT,

Manufacturers of

BRASS, GALVANIZED & SHIP CHANDLERY

HARDWARE,

Nos. 16 & 18 Chambers St., NEW YORK.

BOXWOOD RULES

And Miscellaneous Measures

IN FULL STOCK AT BOTTOM PRICES.

WM. H. BELCHER,

MANUFACTURER AND IMPORTER,

89 Chambers Street, - NEW YORK.

Catalogues ready.

P. W. Gallaudet & Co.

Cor. Broadway and [illegible] St., New York.

Bankers and dealers in COMMERCIAL PAPER. Stocks and Bonds dealt in for cash or on margin at New York Stock Exchange.

TIN US OLSEN & CO.,

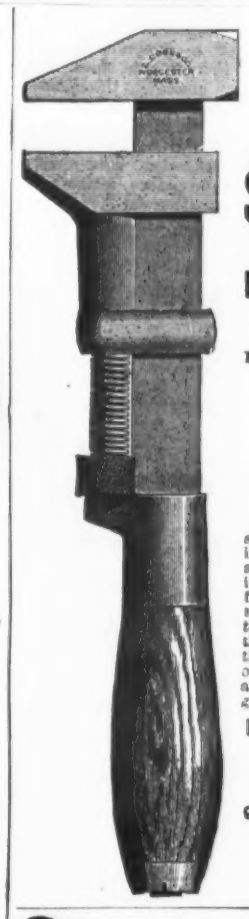
STANDARD SCALES

AND

Testing Machines.

Manufacturers of all descriptions of Testing Machines. Tests made daily.

Office and Works, N. W. cor. 12th and Hatfonwood Sts., Philadelphia.



L. COES'

Genuine and Mechanics

PATENT

Screw Wrenches

MANUFACTURED BY

L. COES & CO.,

Worcester, Mass.

ESTABLISHED IN 1839.

Our Genuine Wrenches are made with straight bars, full width and enlarged jaw, having ribs cast inside, which strengthen the jaw and give a full bearing on front of bar. These improvements, in combination with our new ferrule, made with double bearings, an iron tube, fitted to the shank and resting against the lower bearings, rigidly held in position by the handle and nut, effectually preventing back thrust of ferrule (see sectional view), verify our claim that we manufacture the heaviest and strongest Wrench in the market. None genuine unless stamped

L. COES & CO.,

Worcester, Mass.

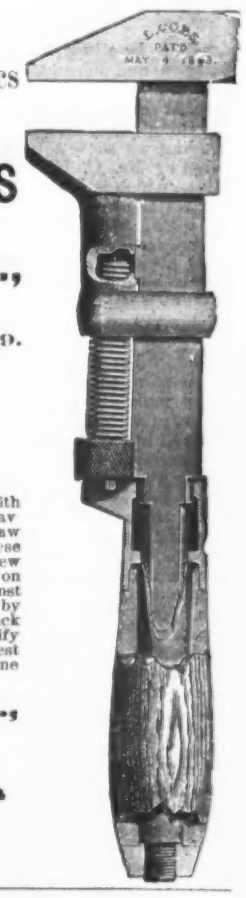
Warehouse,

97 Chambers and 81 Reade Sts

NEW YORK.

DURRIE & McCARTY,

Sole Agents.



1883.

PENNSYLVANIA LAWN MOWER.

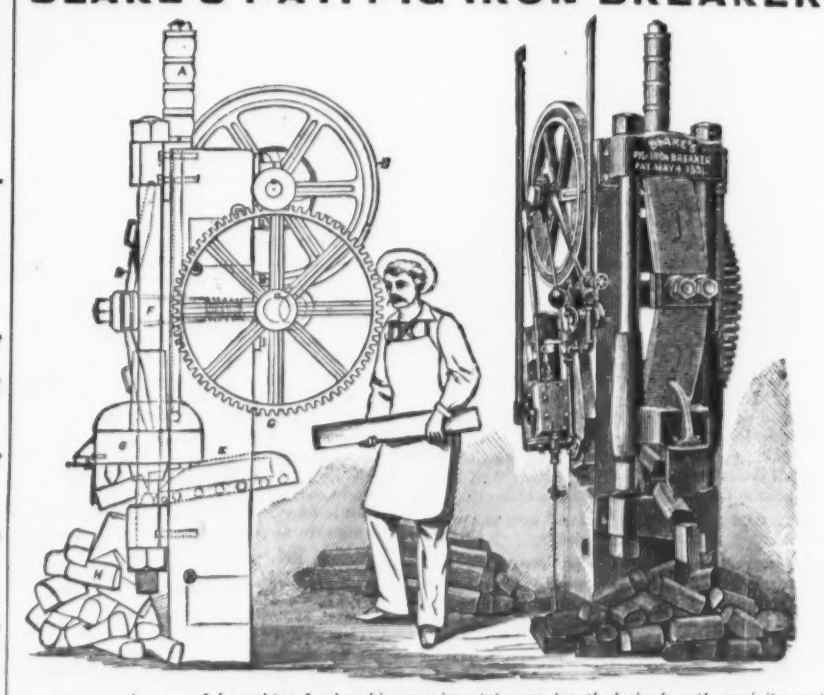
Has no Equal, Surpassing all others, and pronounced

"THE BEST."

For descriptive catalogue and prices write to

LLOYD, SUPPLEE & WALTON, Philadelphia.	LOCKWOOD, VANDOORN & TAYLOR, Cleveland
DURRIE & McCARTY, New York.	WM. FRANKFURTH & CO., Milwaukee, Wis.
AMES PLOW CO., Boston, Mass.	WALTER S. LUDLOW, Cincinnati, Ohio.
PRATT & CO., Buffalo, N. Y.	LLOYD & CLARKE, La Crosse, Wis.
SIMMONS HARDWARE CO., St. Louis, Mo.	H. MITHOFF & CO., Columbus, Ohio
HAMILTON & MATTHEWS, Rochester, N. Y.	BURROUGH BROS., Kansas City, Mo.
MARKLEY, ALLING & CO., Chicago, Ill.	THE TODD-DONIGAN IRON CO., Louisville, Ky.
HUNTINGTON, HOPKINS & CO., Sacramento and San Francisco, Cal.	LAYMAN, CAREY & CO., Indianapolis, Ind.
R. A. CULTER & CO., Peoria, Ill.	THOMAS, PURVEAR & SLOCUMB, Evansville, Ind
DUCHARME, FLETCHER & CO., Detroit, Mich.	A. E. BONESTEEL, Troy, N. Y.
	PERRIN BROS., Lafayette, Ind.

BLAKE'S PAT. PIG IRON BREAKER.



A new and successful machine for breaking pig iron into any length desired, with rapidity and economy. Besides saving in cost of breaking by hand, it secures the greatest economy in melting. Several machines already in use. Every machine guaranteed against breakage of parts. Requires but three horse-power. Can be run by belt or have small engine attached.

Send for Circulars, Prices, &c.

BLAKE CRUSHER COMPANY,

Sole Makers, 85 Orange Street NEW HAVEN, CONN.

LOVEJOY & DRAKE,

Manufacturers' Agents,

101 READE STREET, NEW YORK.

Iron and Chain, Heavy and Wagon Hardware

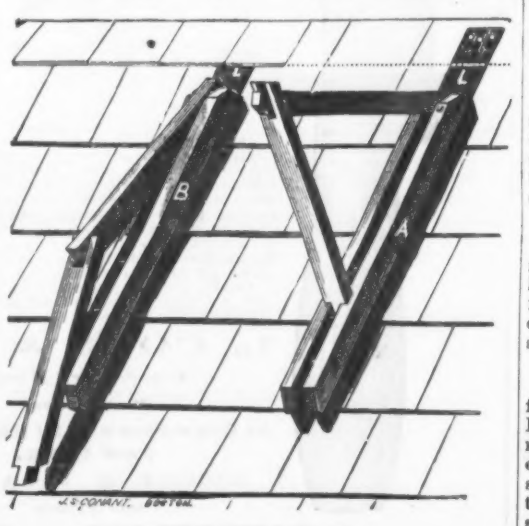
RAILROAD & BUILDERS' SUPPLIES, &c.

ARTESIAN WELL MACHINES.

For our Full Page Advertisement, See First Issue of Each Month.

A New Roofing Bracket.

There is a well-defined demand among builders, and more particularly shingle roofers, for a device for sustaining a simple form of scaffolding during the process of laying shingle roofs. In the accompanying engraving we show a roof bracket manufactured by Mr. C. H. McIntire, of Reading, Mass., which is being at present introduced to the trade for this purpose. The bracket is of wood, with the exception of the pins which fasten the parts together and the plate by which it is secured to the roof. The engraving shows the bracket on the right in position for use, while on the left it is shown partly folded together, indicating the small compass to which it may be reduced when not in use. The bracket in use is secured by three nails driven very nearly home, in such a position as to be covered by the succeeding course of shingles. Holes corresponding to the nails are provided in the upper end of the plate L. From these holes slots are made running upward, thus making it possible to hook the plate upon the nails in such a manner as to secure it firmly in place. As the work progresses and the bracket is required in another position, it is released by shoving upward and lifting off from the nails which have held it, and the shingle which has been placed over them, as shown in the view to the left, closes down in such a manner as to cover them from observation. The specimen of the bracket which we have examined is a very neat article in point of workmanship and construction. Three pins between the parallel pieces forming the base make it adjustable for different pitches of roofs. It is strong and appears likely to give satisfaction to those who employ it.



A New Roofing Bracket.

LATEST LEGAL DECISIONS.

SALE FOR CASH—PAYMENT WAIVED.

A sold for cash to B 360 packages of goods, who in turn sold them to C. A then attached the goods in the hands of C as the property of B, and C took them back by replevin. An action for conversion was then brought, and the plaintiff recovered. The defendant carried the case in error—Heller *vs.* Elliot—to the Supreme Court of New Jersey, where he got a decision in his favor. The Chief Justice (Beasley), in the opinion, said: "The jury have found that as the sale was for cash, and no money was paid, the title did not vest in the vendee, but remained in the vender. But if the vender in any way waived the requirement of a cash payment, then the title vested in the purchaser. In this case we think there has been a waiver of the condition of payment. After the delivery of the merchandise, and after the sale of it by the vendee, the original vender caused an attachment to be issued against the property of his vendee for the price of the goods, and had these very goods levied upon under the writ. When the plaintiff proceeded to enter upon this cause of law, he was plainly in a position to adopt either branch of an alternative. He could have insisted that he was still the owner of the goods, and have recovered them and sued the vendee for a breach of his stipulation to accept and pay for them, or he could waive the stipulation as to payment as a prerequisite to the vesting of the title, and sue for the stipulated price. This latter course was the one pursued by him when he sued out the writ of attachment, and that procedure is utterly incompatable with the theory that the title to the property had not become fixed in the vendee."

1. SURETY—PARTNERSHIP—DISSOLUTION—2. SUBROGATION OF SURETY.

A, B and C, partners, made their firm note to C, who indorsed it, and it was negotiated. The firm paid interest upon this note until A left the concern. B and C took the assets and assumed the liabilities. In an action by C against A and B on this note, he, C, having paid it, the defendants had judgment. C carried the case—Moore *vs.* Topliffe—to the Supreme Court of Minnesota, where a reversal was got. Judge Sheldon, in the opinion, said: "1. As between A, B and C, after the dissolution and assumption of the assets and liabilities, A and B were principal debtors, and C their surety upon this note. 2. It is a settled principle in equity that a surety, upon paying the debt of the principal, is entitled to be substituted in the place of the creditor, as to all securities held by the latter, and have the same benefit he would have therein."

CONTRACT TO EXTEND TRADE NOT IN WRITING—PARTNERSHIP.

A agreed verbally with B, C and D, who were partners, that he would introduce a certain brand of their lime in a specified locality, and work up a trade in it, and sell no other kind of lime for a period of five years. He was bound to give all the time and means reasonably necessary to introduce this lime to the public, and he was to have the exclusive right to sell the lime in this territory and to receive the same at reduced rates. Under this contract A expended large sums of money, and gave all the requisite attention to develop the trade, but after having established an extensive trade, B, C and D refused to abide by their verbal agreement. In a suit for damages for breach of contract—Frazier *vs.* Howe—the defendants made their defense on the ground that the contract was not in writing, which the statute of frauds required, as it was not to be fully performed within a year, and they succeeded. D, of one of the partners, died, and his widow came into the firm, and she sought to escape from A's claim, on the further ground that she had never been a party to the contract. The judgment below was reversed by the Supreme Court of Illinois. Judge Scofield, in the opinion, said: "1. A was entitled to recover in *quantum meruit* the amount expended by him in working up the trade, and the value of his time and services and that of his employees in effecting the object of the contract, and evidence of the verbal agreement is admissible to prove the plaintiff's case. 2. When the widow of one of the concern comes in to take her husband's place therein, and there is no intention to make any change in the business operations, she must be held to answer the burdens and to take benefits her husband would have undergone and enjoyed. So, if the firm, after her accession, continues to execute a contract made before, which benefits her, and the firm afterward repudiate the contract on the ground that it is not in writing, she will be liable with the other partners under a *quantum meruit*."

ENFORING CONTRACT—TIME OF PAYMENT.

W agreed to sell A a house and lot, but no time was fixed for the payment of the purchase money. W only signed the contract, and A paid him a part of the money. W refused to convey the land, on the ground, first, that it was not binding, because of the lack of A's signature; second, that the purchase money had not been paid or tendered in time. A succeeded in the suit, and W carried it on appeal—Austin *vs.* Wacks—to the Supreme Court of Minnesota, where it was affirmed. Judge Vanderburgh, in the opinion, said: "1. The objection that the contract was not mutual, because not signed by A, and therefore not valid, is not sufficient to defeat A's right to have the contract enforced. The contract was partly executed upon a valuable consideration, and it is fair that it should be enforced. 2. Unless the time of payment is made an essential part of the contract, delay in making payment will not destroy a vendee's rights."

BOARD OF TRADE—VALUE OF MEMBER'S SEAT—CREDITORS.

The certificate of membership of one of the Chicago Board of Trade was directed to be sold for the benefit of the holder's creditors, and he carried the judgment—Barclay *vs.* Smith—to the Supreme Court of Illinois, where it was reversed. Judge Craig, in the opinion, said: "This certificate only entitles the holder to attend the meetings of the board and deal in the various products of the country, but he is not entitled under it to any dividends or pecuniary profits. Though a valuable privilege is not property, and is not subject to sale for the member's debts, it is a right which may be regarded as valuable, and which has a market value; but it is a right which cannot be diverted or destroyed except by the board itself or a failure of the member to conform to its rules and regulations, and it is not transferable except the assignee is approved by the votes of at least ten directors. This membership is like the membership of a church, with its privileges, and the memberships in Masonic and other social organizations, and licenses to carry on certain callings or business. It has never yet been claimed that these privileges, however valuable, can be made the subject of a sale to satisfy a debt."

PARTNERSHIP ACCOUNTS SETTLED—REOPENING ACCOUNTS.

A firm had been dissolved and had fully settled all of their accounts, with creditors and with each other. One member, finding, as he thought, that he had been defrauded by the sales of goods of which no proper account was kept, brought his complaint for a new accounting. It was refused, and he carried the case to the Court of Appeals of Kentucky, where he was again defeated. Judge Prior, in his opinion, said: "In this case the appellant made nearly all the purchases. He knew what the goods cost, and must have had some idea of the marketable value. The books were open to him, and he made a settlement with his eyes open, and he is now in a court of chancery unable to designate any wrong practiced upon him, but asking the Chancellor to reopen the settlement with a view of ascertaining whether or not he has been defrauded."

INJUNCTION—TRESPASS.

C removed a fence, which he said was on a public road, and after it was replaced he removed it again. He threatened that he would continue to remove it, and he applied for an injunction to prevent the replacement of the fence, and got it. The defendant carried the cause—Owens *vs.* Cropett—to the Supreme Court of Illinois, where the decree was reversed. Judge Walker, in the opinion, said: "For a single trespass, when the party charged can respond in damage, an injunction will not be granted upon a threat to commit another trespass. But if he is insolent or threatens to continue grave trespass, he will be enjoined. In this case, however, there is a defect in the proof which will defeat the plaintiff's bill; he does not show or assert that the fence in question was on a legally established road and was located at the precise place where the fences are built."

Accident to the Steamer Main.—The steamer Main, of the North German Lloyd, which sailed for Bremen on Saturday afternoon, broke her shaft soon after passing Sandy Hook, and had to be towed back to port. She left her dock in Hoboken at 2 o'clock Saturday afternoon, with about 65 cabin passengers and a large number in the steerage. The Main proceeded down the Bay and passed through the Narrows at about 3 o'clock. The tide was high at the Sandy Hook bar, which was passed at about 4.40 p. m. The pilot left the steamer, which headed out to sea, but in less than five minutes afterward she was seen to slow up and come to a standstill. Shortly afterward she showed signals of distress, her main shaft having broken. Captain Heimbruch ordered a boat to be lowered, and sent one of his officers to Sandy Hook, where he telegraphed to Oelrichs & Co., the agents of the North German Lloyd, to send down tugs to tow the disabled steamer back into port. Had the accident occurred in mid-ocean, it might have proved very serious. As it was, the vessel will probably not be delayed here more than a few days.

INDUSTRIAL ITEMS.

CONNECTICUT.

The Hartford Hammer Co. are building up a considerable export trade in their specialties, which have already gained a wide reputation in Scotland and are being introduced there. Shipments of two lots of 100 dozen each were 'ately made to Scotland on order.

MASSACHUSETTS.

The Merrimack Mfg. Co., of Lowell, have recently put in a 5-inch Curtis pressure regulator on their steam pump, which throws a 16-inch stream of water and feeds a battery of boilers furnishing 7000 horse-power of steam.

PENNSYLVANIA.

The Pennsylvania Bolt and Nut Co. are fairly started in their new works, located in Lebanon. The premises are probably the most extensive and convenient of anything of the kind in this country, and were designed and built especially for this class of trade. The wareroom is 150 x 50, three stories in hight, with car track for the first and second stories. The machine shop and furnishing room is 120 x 80, the burring room 60 x 20, and the factory, which contains a 10-inch train of rolls, is 80 x 120. They manufacture all descriptions of bolts and nuts from ¼ up to 2½, besides boiler rivets, washers, turn-buckles, &c. A very successful career may be expected, inasmuch as the managers have had long experience in the business, a plant designed for convenience and labor saving, and the most improved machinery, besides controlling every process of manufacture from the puddling furnace through the rolling mill until its conversion into the finished article.

The Jackson Mfg. Co., of Harrisburg, are meeting with a great demand for their patented steel barrows. Among others they manufactured pig-metal barrows, charging barrows and steel mining wagons, which are in use in all sections of the United States, besides which they are gradually working their way into foreign countries.

ILLINOIS.

The Stover Mfg Co., of Freeport, manufacturers of special machinery, have completed 15 barb-wire machines for the H. B. Scutt Co., of Pittsburgh, and have just shipped one carload of feed mills to St. Joseph, Mo., and to Baltimore and Lincoln, Neb. They are running their establishment to its full capacity, and are full of orders.

The Morris Cutlery Co., Morris, are employing at present 25 men on full time. They report that orders are coming in very freely. They make over 200 different styles of pocket knives, and have a capacity for turning out 700 dozen per month at present, and claim workmanship and material equal to any made.

The Chicago Forging Co., Pullman, have just added to their works two new power drills, a new planer, 4 x 21 feet, and a press. They are running full time, and anticipate an excellent fall trade.

A new barb fence wire company is to be located at Ottawa, on the lines of the C., B. & Q. and C. & R. I. railroads. The capital has been subscribed, and the company will begin operations within the next 90 days.

The Aurora Malleable Iron and Machine Works have shut down their malleable-iron department for repairs. They will start up again September 1; in the meantime they will build new brick stack, also two new annealing ovens. They have just filled an order for 5000 anvils for R. A. Austin & Co., Oregon, and are completing an order for 4000 more for the same firm. They are also building the machinery for the New Aurora Watch Co., which will begin operations September 1.

The Wilcox Mfg. Co., Aurora, report they are full of orders for the Richards parlor door hanger, and are pushing the new Aurora barn and warehouse door hanger as much as possible. This hanger is made in two sizes, for 2 to 8 and 8 to 14 feet wide doors.

WISCONSIN.

The Appleton Mfg. Co., of Appleton, will commence the erection at once of a new building, 32 x 100 feet, two stories, to be completed September 1. They report trade good on their new lightning hay carrier, and have in preparation a new hay fork, in which, with the carrier, are combined many excellent features. They are also manufacturers of the "Badger" seeder, which they claim is superior to any machine of the kind in the market.

The Champion Horse Nail Co., Appleton, report that they are very busy and will run extra hours from now on for the balance of the year.

MISSOURI.

The Medart Patent Pulley Co., St. Louis, have removed to their new works and office, Nos. 1206 to 1214 North Main street. They have now a capacity for manufacturing 300 pulleys per day.

Telephone Troubles.—Reports from Oshkosh, Wis., are to the effect that measures were recently taken to cut down the wires and poles of the Wisconsin Telephone Co., in accordance with an ordinance recently passed by the Council upon the refusal of the company to pay a license of $300 exacted by the same ordinance. The work of destruction was only partly carried out, measures having been taken by the company to stay the proceedings. Various plans of operation were suggested and discussed by the stockholders, but no positive course was decided upon. One proposed plan was to take the matter into the courts and there have it settled. Another was to raise the rental of telephones to meet the additional expense of the license, and thereby indirectly cause the pockets of patrons to stand the city license tax. Still another idea was to withdraw the service from Oshkosh entirely until the city reimbursed the company for all damage done and guaranteed a free and unobstructed right of way for the line. Which course will be pursued yet remains to be decided. In defense of their refusal to pay the imposed tax the company claim that it is already paying a State tax in place of all other taxes, and to pay the proposed license would take fully 20 per cent. of the company's net receipts from the exchange, and it is thought, moreover, that should the company accede to the demand made by Oshkosh, every city having an exchange would adopt the same course.

A New Source of Albumen.—Albumen is a substance indispensable in many processes of manufacturing. It is among the most nutritive properties of beef and vegetables, but almost the only source from which it has hitherto been obtained as a merchantable commodity is the hen's egg, the "white" being pure albumen. In supplying the demands of commerce for this article the barnyards of France have been taxed to the utmost. As eggs are rarely found in other countries beyond the local requirements for food, very naturally the cost of albumen to the consumer is high, ranging from $1.25 to $2.40 per pound, and the trade is commonly supposed to yield enormous profits.

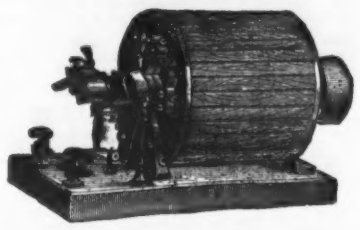
We now hear it asserted by enterprising gentlemen of this city, and apparently on adequate authority (the inventor being Prof. Uno Harold Hillman, a Scandinavian chemist), that pure albumen is about to be manufactured and put upon the market from a source hitherto unknown, and that the available supplies are literally as boundless as the ocean. The source referred to is the spawn of fish, so that cur cod, menhaden and shad fisheries are to contribute additional wealth from their hitherto waste products. It is predicted that these interests must ultimately receive an immense impetus from increased profits, and that the United States Fisheries Commission will find an incentive for doubling its efforts in fish propagation. Extensive works are in course of erection on the Massachusetts coast, and the United States Albumen Mfg. Co., who own the exclusive right to manufacture albumen and all its products from the spawn or ova of fish, expect soon to begin operations on an extensive scale. Their capital of $300,000 is said to be in strong hands. The process is simply to separate the spawn from the inclosing membrane, crush it in machinery, and the albumenous water resulting is boiled in a vacuum at a temperature not exceeding 115° F. Albumen is consumed on a large scale in cotton mills, print works, by manufacturers of fine stationery, and in many of the arts. A process which promises to reduce the cost more than one half is of some importance.

The White Star steamship Britannic recently arrived at this port after a passage of a little more than eight days from Queenstown. The recent round trip of the Britannic from Liverpool to this city and back again was accomplished in 19 days, 2 hours and 30 minutes, and this is said to be the quickest round trip on record, either from Liverpool or New York.

THE
AMERICAN DYNAMO-ELECTRIC MACHINE,
For Electro-Plating. Electrotyping, &c.

Requires no Water.

Combining all the



Latest Improvements.

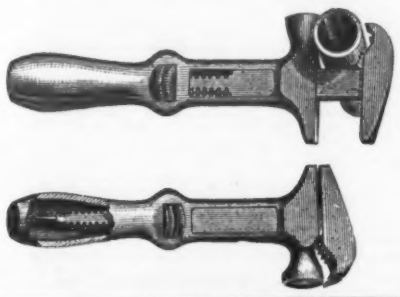
Cannot Reverse Current.

The Zucker & Levett Chemical Co.,
GENERAL AGENTS,

Manufacturers and Importers of NICKEL PLATERS' SUPPLIES.

540, 542, 544 & 546 WEST 16TH STREET, N. Y.

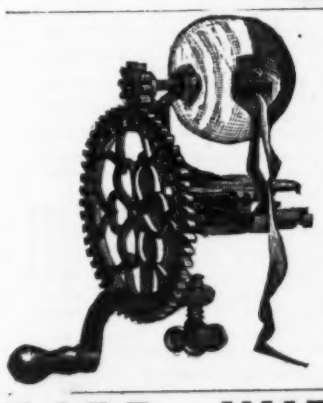
BOARDMAN'S PATENT COMBINATION WRENCH.



The Most Popular Combination Tool in the Trade.

Made in the most Thorough Manner, of the Best Material and Finish,

By JOHN J. TOWER,
96 Chambers Street,
NEW YORK.



THE
WAVERLY APPLE PARER.
It has the quick return motion of knife. The Knife is screwed on. The pinions have square holes and are fitted on shafts with square ends. The parings cannot fall into the gearing. It is rapid, effective, simple. Send for circular.

L. A. SAYRE,
28 Orange Street, Newark, N. J.,
MANUFACTURER OF
Hardware Specialties, Mechanics' Tools, &c.
REPRESENTED BY
W. H. ELPHINSTONE, JR.

BARB WIRE MACHINERY.
We have made the Inventing and Manufacturing of this class of Machinery
A SPECIALTY
for eight years, and have the Largest and Best Facilities of any Manufactory in the country.
Will be pleased to give Estimates on receipt of Sample Barb.

STOVER MFG. CO.,
FREEPORT, ILL.

UNION FILE WORKS,
OF BALTIMORE, MD.

In offering these Files to the trade we guarantee to give satisfaction, each File being thoroughly examined at every stage of manufacture and tested by an expert before leaving the Works.

FLAGLER, FORSYTH & BRADLEY, Agents, 298 Broadway, New York.

NEW CHAMPION FORCE PUMP.

HAS
Vacuum Chamber and Air Chamber,
PRODUCING
A CONTINUOUS FLOW OF WATER,
Both in Suction and Discharge,
AND THEREFORE
WORKS SMOOTHER
AND
EASIER
THAN ANY OTHER FORCE PUMP IN THE MARKET.
HAS
Seamless Drawn Brass Cylinders and No Stuffing Boxes.
Never Freezes in Winter, and is Not Liable to Get Out of Order.

With hose attachment it is valuable as a fire protection, and for sprinkling lawns, gardens, &c.
It is light, neat, and easy to handle, and yet strong, substantial and durable, and is adapted to all kinds of wells, dug, drilled or driven.
Send for descriptive circular and price list.

CLARK BROS.,
BELMONT, N. Y., U. S. A.,
SOLE MANUFACTURERS.

THE JENKINS STANDARD PACKING is acknowledged by users as the *Best* in the world. Unlike all other Packings, the **Jenkins Standard Packing** can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal) and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The **genuine** has stamped on every sheet, **"Jenkins Standard Packing,"** and is for sale by the Trade generally. Manufactured only by

JENKINS BROS.,
PROPRIETORS JENKINS' PATENT VALVES, PACKING, &C
71 JOHN ST., NEW YORK.

John T. Lewis & Bros.
No. 231 South Front St.,
PHILADELPHIA.

TRADE MARK.
MANUFACTURERS OF
Pure White Lead, Red Lead, Litharge, Orange Mineral, Linseed Oil,
AND PAINTERS' COLORS.

JOHN JEWETT & SONS
Manufacturers of the well-known brand
WHITE LEAD

TRADE MARK
ALSO MANUFACTURERS OF
LINSEED OIL.
181 Front Street, NEW YORK.

The Atlantic White Lead and Linseed Oil Co.,
Manufacturers of
White Lead (Atlantic), Red Lead, Litharge, Glass Makers' Litharge and Orange Mineral;
LINSEED OIL,
Raw, Refined and Boiled.
ROBERT COLGATE & CO.,
257 Pearl St., NEW YORK.

SALEM LEAD COMPANY,
CORRODERS AND MANUFACTURERS OF
PURE WHITE LEAD

ALSO MANUFACTURERS OF
Lead Pipe and Narrow Sheet Lead.
F. A. BROWN, Treas. SALEM, MASS.

EXCELSIOR AND CLIPPER LAWN MOWERS

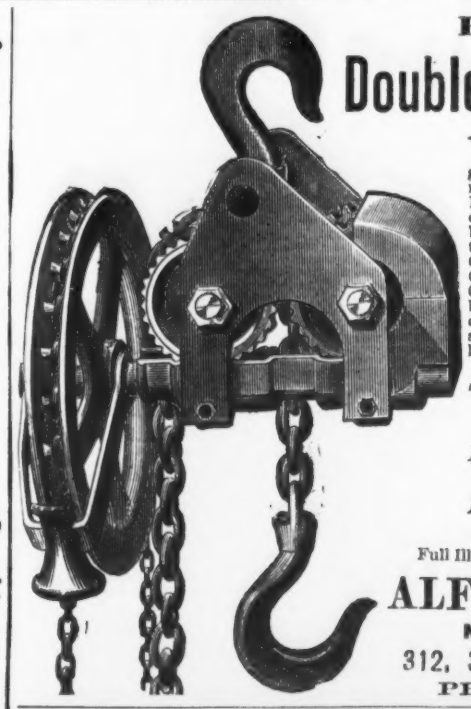
GUARANTEED BEST & CHEAPEST
LARGE REDUCTION IN PRICE

HAND MOWERS 10 TO 20 IN.
HORSE MOWERS 25 TO 40 IN.
CHADBORN & COLDWELL MANUF'G CO.
NEWBURGH, N. Y.
Send for Circular & Price-List.

A. F. PIKE,
Pike Station, - - - New Hampshire,
Manufacturer and Wholesale Dealer in
Bluestone
For Scythes, Axes, Knives and Turpentine Hacks
Factories at Pike Station, N. H. and Evansville & Westmore, Vt.
Genuine Old Reliable,
Indian Pond (Red End),
Premium, Union,
White Mountain,
Letolle, Hacker,
Diamond Grit,
The New Boss,
Lamoille, Hazy,
Willoughby Lake,
Green Mountain,
Black Diamond,
Mowing Machine,
German Pattern,
Chocolate, Ax Bits.

Stones made, labeled and branded in any style desired. PRICE and QUALITY GUARANTEED. All the above brands are of clear, keen grit, and will not glaze.

BOX'S PATENT
Double Screw Hoists.



The unbounded reputation these Hoists have gained for themselves the last four years has no equal. There are now over 7000 in use. Large manufacturers have duplicated their orders a dozen times over. They are in use by all city departments, railroad companies, the United States Government, the English Government, the French Government, the Chinese Government, and in Russia, Germany, Chili, Brazil, Venezuela and Cuba. They have been awarded three silver medals and five diplomas. One trial will convince you they are the best in every particular. Sizes, 500 lbs. to 40,000.

Superior Hand and Power Traveling Cranes, from 1 to 40 tons.

Elevators for Heavy Work, 1 to 10 tons capacity.

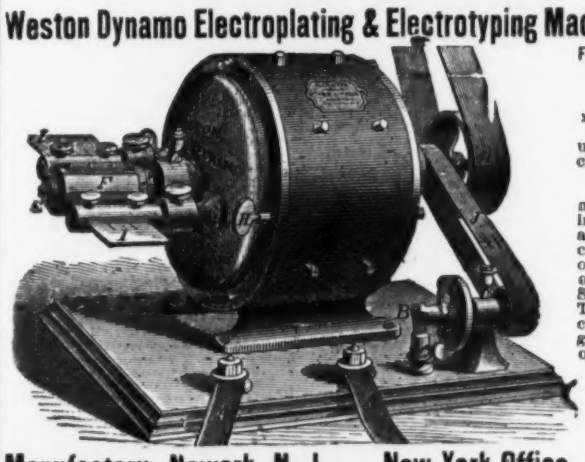
Radial Drills of the Most Improved Kind.

Full Illustrated Circulars on application.

ALFRED BOX & CO.,
Northern Liberty Works,
312, 314 and 316 GREEN STREET,
PHILADELPHIA, PA.

R. W. MUSTARD. C. C. BENNETT.
MUSTARD & CO.
STOREKEEPERS,
COMMISSION AGENTS
and Importers of
AMERICAN GOODS.
SHANGHAI, CHINA.
Consignments Solicited.
SAMPLES FORWARDED, FREE OF EXPENSE TO MANUFACTURERS, BY OUR REPRESENTATIVES IN AMERICA, MESS. SEELY & HOWELL, 19 STONE ST. NEW YORK CITY.

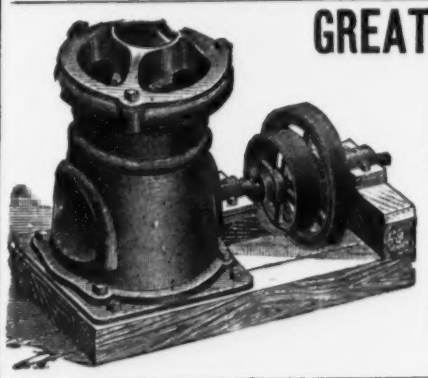
HANSON, VAN WINKLE & CO., Sole Agents for
Weston Dynamo Electroplating & Electrotyping Machines, Newark N. J



For Nickel, Bronze, Brass, Copper and Silver Plating.
Over 1000 machines in use.
Are used by all leading stove manufacturers.
Experienced men sent to put up machines and instruct purchasers.
INFRINGEMENTS.
We call attention to infringements of the Weston Machine in which Automatic Switches are used to prevent change of current. The Weston Co. are owners by grant or purchase of all forms of Automatic Switches for Plating Machines. The adoption of these machines will certainly lead to great loss to parties purchasing or using them.
MANUFACTURERS OF
Cast Nickel Anodes, Pure Nickel Salts, Polishing Materials.

Manufactory, Newark, N. J. New York Office, 92 & 94 Liberty St.

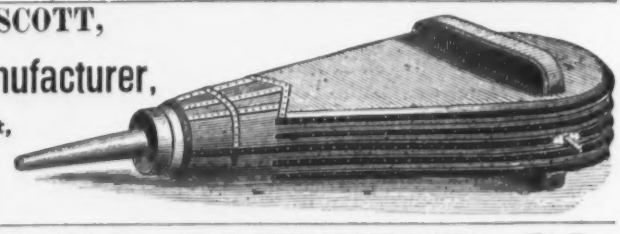
GREATEST ROCK BREAKER ON EARTH.



CAPACITY { A TON A MINUTE. DON'T FORGET IT.
Guaranteed to do Double the Work of any other or Money Refunded.
SEND FOR CIRCULARS,
ALSO
Engines, Boilers, Stamp Mills and Mining Machinery.

GATES IRON WORKS,
52 Canal St., Chicago.

GEO. M. SCOTT,
Bellows Manufacturer,
Johnson Street,
Cor. 22d St.,
CHICAGO, ILL.



FLAMMANG INJECTOR CO.,
MANUFACTURERS OF
THE BEST AND MOST IMPROVED INJECTOR ON THE MARKET.
Send for Catalogue to
44 Atwater Block - - CLEVELAND OHIO.

GARRY IRON ROOFING COMPANY

Largest manufacturers of Iron Roofing in the world. Manufacturers of all kinds of
IRON ROOFING
Crimped and Corrugated Siding, Iron Tile or Shingle,
Fire-Proof Doors, Shutters, &c

IRON ORE PAINT AND CEMENT.
152-158 MERWIN STREET, CLEVELAND, O.
Send for Circular and Price List No. 9.

FIRE BRICK, TILE, SHAPES.

CLIMAX FIRE BRICK CO.,
Successors to Red Bank Fire Brick Co.,
Blast Furnace and Steel Hole Brick
A SPECIALTY.
THOS. JOHNSTON, Agt., P. O. Box 976, Pittsburgh, Pa.

RIVETS

C. F. HARRISON,
BOILER, BRIDGE & TANK
CAYAHOGA FALLS, OHIO.

RIVETS

New York Wholesale Prices, July 19, 1883.

(For Wholesale Metal Prices See Page 32.)

HARDWARE.

Anvils.
Eagle Anvils American. ...... ℔ 10c—dis 20 %
Wright's .... 11c @ 11¼c
Armitage's Mouse Hole .... 9½c @ 9¾c
Armitage's Mouse Hole (extra quality) 11½
Trenton 10½c
Wilkinson's 10½c

Anvil Vise and Drill.
Millers Falls Co., $18.00 .... dis 20 %
Cheney Anvil and Vise .... dis 33⅓ %

Augers and Bits.
Conn. Valley Mfg. Co.; Douglass Mfg. Co.; C. E. Jennings & Co.; Humphreysville Mfg. Co.; Ives; Beecher (French, Swift & Co.); Griswold; Nobles Mfg. Co.; Snell Mfg. — dis 45&10 % from list of Jan. 7, 1880.
Watrous & Co. Extension Lip .... dis 35 %
Cook's Douglass Mfg. Co. .... dis 40&10 %
Patent Solid Head .... dis 30 %
Lewis' Patent Single Twist .... dis 45 %
Russell Jennings' Auger, Dowel, Machine-Dowel and Hand Rail Bits .... dis 10&10&10 %
Russell Jennings' Augers .... dis 16⅔&10&10&10 %
Russell Jennings' Car and Machine Bits, Boring-Machine and Millwrights' Augers .... dis 25&10&10&10 %
Imitation Jennings' Bits .... dis 50 %
Ives' "Jennings" Bits .... dis 40&10 %
Snell Mfg. Co.'s Jennings' Bits .... dis 40 %
Expansive Bits, Clark's, small, $18; large, $26 .. dis 25 %
Expansive Bits, Ives' .... $20 @ $30—dis 33⅓&10 %
Expansive Bits, Blake's .... $20—dis 40 %
Expansive Bits, Derby, $17 and $26 .... dis 40 %
Hollow Augers, Ives; Hollow Augers, French, Swift & Co. .... dis 25 %
Hollow Augers, Douglass' .... 25 %
Hollow Augers, Bonney's Adjust. ℔ dz. $48—dis 25&10 %
Hollow Augers, Stearns' Adjust. ℔ dz. $48—dis 20&10 %
Hollow Augers, Ives' Expansive, each $4.50—dis 30&10 %
Hollow Augers, Universal Expan., each $4.50—dis 20 %
Wood's .... dis 25 %
Gimlet Bits .... $7.50 ℔ gross, dis 50 %
Gimlet Bits, Diamond .... ℔ doz. $1.10, dis 25&10 %
Gimlet Bits "Bee" .... dis 25 %
Double Cut Gimlet Bits, Shepardson's .... dis 40 %
Double Cut Gimlet Bits, Ct. Valley Mfg. Co. dis 30&10 %
Double Cut Gimlet Bits, Hartwell's .... dis 60 %
Double Cut Gimlet Bits, Douglass' .... dis 40 %
Double Cut Gimlet Bits, Ives' .... dis 50 %
Morse's Bit Stock Drill .... dis 25&10 %
Holts Bit Stock Drills .... dis 25&10 %
L'Hommedieu's Ship Augers .... dis 15 %

Awl Hafts.
Sewing, Brass Ferrule .... $3.50 ℔ gross—dis 40&10 %
Patent Sewing, Short .... $1.00 ℔ doz.—dis 40&10 %
Patent Sewing, Long .... $1.20 ℔ doz.—net
Patent Peg, Plain Top .... $10.00 ℔ gross—dis 40&10 %
Patent Peg, Leather Top .. $12.00 ℔ gross—dis 40&10 %

Awls, Brad Sets, &c.
Awls, Sewing, Common .... ℔ gross $1.70—dis 25&10 %
Awls, Shouldered Peg .... ℔ gross $2.45—dis 25&10 %
Awls, Patent Peg .... ℔ gross 69c—dis 25&10 %
Awls, Shouldered Brad .... ℔ gross $2.70—dis 25&10 %
Awls, Handled Brad .... $7.50 ℔ gross—dis 25&10 %
Awls, Handled Scratch .... $7.50 ℔ gross—dis 25&10 %
Awls, Socket Scratch .... $1.50 ℔ gross—dis 10&10 %
Brad Sets, Aiken's .... ℔ doz $12.00—dis 45&10 %
Millers Falls Adj. Tool Hdles .... ℔ doz $12—dis 25 %
Brad Sets, No. 42, $10.50; No. 43, $12.50 .... dis 70&10&5 %
Brad Sets, Stanley's Excelsior, No. 1, $9.60 .. dis 30&10 %
Brad Sets, Stanley's Excelsior, No. 2, $1.80 .. dis 30&10 %
Brad Sets, Stanley's Excelsior, No. 3, $7.80 .. dis 30&10 %

Axes.
Single Bit, 4½ to 5½ and under .... ℔ doz $8.00 net
Single Bit, 4½ to 6 and over .... ℔ doz $8.50 net
Single Bit, beveled .... 50c ℔ doz advance
Double Bit, 4½ to 5½ and under .... ℔ doz $15.00 net
Double Bit, 4½ to 6 and over .... ℔ doz $16.00 net
Double Bit, beveled .... $1.00 ℔ doz advance

Axle Grease.
Frazer's .... ℔ ℔ 6c

Axles.
Standard list .... dis 45 %

Balances.
Spring Balances .... dis 33⅓ %

Bells.
Hand, Light Brass .... dis 65&10 @ 70 %
Hand, Extra Heavy .... dis 45 %
Hand, White Metal .... dis 60 %
Hand, Silver Chime .... dis 20&10 %
Hand, Globe (Cone's Patent) .... dis 25&10 %
Gong, Abbe's .... dis 20&10 %
Gong, Yankee .... dis 30&10 %
Gong, Barton's .... dis 30&10 %
Crank, Taylor's .... dis 25&10 %
Crank, Brooks' .... dis 50&10&2 %
Crank, Cone's .... dis 10 %
Crank, Connel's .... dis 15&10 %
Lever, Sargent's .... dis 55&10 %
Lever, Taylor's Bronzed or Plated .... net
Lever, Taylor's Japanned .... dis 25&10 %
Lever, R. & E. M. Co.'s .... dis 50&10&2 %
Lever, Reading .... dis 25&10&10 %
Pull, Brook's .... dis 50&10&2 %
Pull, Western .... dis 25&10 %
Call .... dis 25 %
Cow, Common Wrought .... dis 55&10 %
Cow, Western .... dis 20&10 %
Cow, Western, Sargent's list .... dis 55&10 %
Cow, Kentucky "Star" .... dis 20&10 %
Cow, Kentucky Sargent's list .... dis 55&10 %
Cow, Dodge's Genuine Kentucky, new list—

Nos.	0	1	1½		4	5	6	Hog	
	$12.00	10.0	9.0	8.00	7.00	5.00	3.50	2.50	5.00 — dis 60 %

Cow, Texas Star .... dis 40&10 %

Bellows.
Blacksmiths Common .... dis 45 %
Blacksmiths' Extra Pittsburgh Pattern .... dis 20 %
Molders' .... dis 25 %
Hand Bellows .... dis 20 %

Belting, Rubber.
Belting and Packing Co. .... dis 50 %

Bit Holders.
Extension, Barber's .... ℔ doz $15.00—dis 40&5 %
Extension, Ives' .... ℔ doz $15.00—dis 40 %
Diagonal .... ℔ doz $24.00—dis 40 %
Angular .... ℔ doz $24.00—dis 40&5 %

Blind Adjusters.—Domestic .. ℔ doz $3.00—dis 30 %
Excelsior .... ℔ doz $16.00—dis 50&10&2 %

Blind Fasteners.
Mackrell's .... ℔ doz pairs. $1.00 dis 20&10 %
Van Sand's Screw Pattern .... $9 ℔ gro. dis 10&2 %
Van Sand's Old Pattern .... $9 ℔ gro. dis 10&2 %
Washburn's Old Pattern .... $9 ℔ gro. net
Merriman's .... new list, net
Salisbury & Austin, No. 2008 .... $9 per gro. net
Security Gravity .... $9 per gross. net

Blind Staples.
Bar bed, ½ in. and larger .... ℔ ℔ 11c net
Bar bed ⅜ in .... ℔ ℔ 13c net

Blocks.
Penfield Block Co., I. R. and I. Strap'd .. New List dis 40 %
Penfield Block Co., W. I. C. bushed .. dis 40 %
Penfield Block Co., W. I. all steel roll'r .. dis 20 %
Penfield Block Co., L. & I Sheaves .. dis 40 %
Stanley Rule & Level Co.'s .... dis 40&10 %

Bolts.
Cast Iron Barrel Shutter, &c .... dis 55&10 %
Cast Iron Chain (Sargent's list) .... dis 65&10 %
Ives' Patent Door Bolts .... dis 55&10 %
Wrought Barrel .... dis 55&10 %
Wrought Square .... dis 55&10 %
Wrought Shutter, all Iron, Stanley's list .... dis 50&10 %
Wrought Shutter, Brass Knob, Stanley's list .dis 50&10 %
Wrought Shutter, Sargent's list .... dis 55&10 %
Wrought Sunk Flush, Sargent's .... dis 75&10 %
Wrought Sunk Flush, Stanley's .... dis 40&10 %
Wrought B. K. Flush. Com'n Stanley's .... dis 55&2½ %
Carriage and Tire Common .... dis 80@15 %
Carriage and Tire, Philadelphia, new list .... dis 70 %
Carriage and Tire, Philadelphia Pattern .... dis 70 %
Union Carriage .... dis 70 %
R. B. & W. Carriage (old list) .... dis 65 %
Tire, Am. Screw Co.'s, Phila., new list, July 2, 1883 .... dis 80 %
Tire, "Bay State," new list, July 2, 1883 .... dis 65 %
Tire, R. B. & W., new list .... dis 75&10 %
Stove—American Screw Co.'s .... dis 40 %
Stove, R. B. & W. .... dis 40 %
Stove, R. & E. Mfg. Co. .... dis 40 %
Plow .... dis 50 %
Plow, R. B. & Co. .... dis 40 %
Machine .... dis 65&10 %
Bolt Ends .... dis 60&10 %

Borax. .... 10c ℔ ℔ net

Boring Machines. Upright Angular
First quality, no Augers .... $5.50 $6.75 .. dis 45@50 %
Phillips, with Augers .... 7.00 7.50 .... net
Jennings & Co., no Augers .... 5.50 6.75 .... dis 40 %
Saunders' Patent, Regular Bed, $6.00 .... dis 20 %
Saunders' Patent, Extra Bed, $6.50 .... dis 20 %

Boxes.
Interchangeable Shelf Boxes .... dis 20 %

Braces.
Q. S. Backus .... dis 50@60 %
Wilson Mfg. Co. .... dis 10 %
Barber's .... dis 40&5 %
Spofford's Patent .... dis 50&5 %
Ives' Patent Braces .... dis 55@55&5 %
Common Ball (American) .... dis 55 %
Amidon's .... dis 50 %
Barker's Imp'd .... dis 10 %
Empire .... dis 30 %
Buffalo Ball .... dis 40 %

Brackets.
Shelf, plain .... dis 50&10 %
Shelf, fancy .... dis 60&10 %
Reading, Plain .... dis 65&10 %
Reading, Rosette .... dis 60&10 %

Bright Wire Goods, List of June 25, '83 .. dis 70&10 %

Bull Rings.
Union Nut Co .... dis 55 %
Sargent's .... dis 66⅔&10 %
Hotchkiss' low list .... dis 15 %
Humason, Beckley & Co's .... dis 66⅔&10 %
Peck, Stow & W. Co's .... dis 33⅓ & 10 %

Butts.
Wrought Brass .... dis 65&10&5 %
Cast Brass, Tiebout's .... dis 33⅓ %
Cast Brass, Corbin's Fast Joint .... dis 20&10 %
Cast Brass, Loose Joint .... dis 10&10 %
Fast Joint, Narrow .... dis 45&10 %
Fast Joint, Broad .... dis 45&10 %
Loose Joint .... dis 55&10 %
Loose Joint, Japanned .... dis 45&10 %
Loose Joint, Japanned with Acorns .... dis 55&10 %
Parliament Butts .... dis 55&10 %
Mayer's Hinges .... dis 60&10 %
Loose Pin, no Acorn .... dis 50&10 %
Loose Pin, Acorns .... dis 50&10 %
Loose Pin, Acorns, Japanned .... dis 60&10 %
Loose Pin, Acorns, Japanned, Plated Tips .. dis 60&10 %

WROUGHT IRON.

Fast Joint, Narrow .... dis 50&10 %
Fast Joint, Lt. Narrow .... dis 50&10 %
Fast Joint, Broad .... dis 50&10 %
Loose Joint, Broad .... dis 55&10 %
Table Butts, Back Flaps, &c. .... dis 50&10 %
Inside Blind Regular .... dis 50&10 %
Inside Blind, Light .... dis 50&10 %
Loose Pin, Wrt .... dis 55&10 %
Loose Pin, Light .... dis 50&10 %

Spring Hinges:
Geer's Spring and Blank Butts .... dis
Sabin Mfg. Co.'s Double Acting .... dis 35 %
Union Spiral Spring, Japanned .... dis 25 %
Union Spring Hinge Co.'s .... dis 25 %
American Spring Hinge Co.'s .... dis 30 %
Gem Spring Hinges .... dis 30 %
Barker's Double Acting .... dis 20 %
Union Mfg. Co. .... dis 25 %
Bommer's .... dis 25 %
Buckman's .... dis 25 %
Empire .... dis 50&10 %
Acme .... dis 65&10 %
Climax .... dis 50&10 %
Blind Butts, Parker .... dis 70&2 %
Blind Butts, Palmer .... dis 45&10 %
Blind Butts, Seymour .... dis 70 %
Blind Butts, Lull & Porter .... dis 70&10 %
Blind Butts, Nicholson .... dis 45&10 %
Blind Butts, Huffer .... dis 60 %
Blind Butts, Clark's, Nos. 1, 3, 5 .... dis 70&2 %
Blind Butts, Sargent's, Nos. 1, 3 .... dis 66⅔&10 %
Blind Butts, Sargent's, No. 12 .... dis 70&10 %
Blind Butts, Reading's Gravity .... dis 66⅔&10 %
Blind Butts, Shepard's "Noiseless," Nos. 50, 60, 65, 45 and 55 .... dis 70 %
Blind Butts, Shepard's "Noiseless," Nos. 050 and 060 .... dis 70&10 %
Shepard's Lull & Porter Shutter Hinges .... dis 70&10 %
Shepard's Reversible Shutter Hinges .... dis 70&10 %
Clark's Improved Shutter Hinge, Nos. 0, 1, 1½, 2, 2½, 3 .... dis 60&10 %

Bow Pins.
Humason, Beckley & Co.'s, Nos. 1 and 2 .... dis 60 %
Humason, Beckley & Co.'s other Nos .... dis 66⅔&10 %
Sargent & Co.'s .... $19.70 and $21.40. dis 66⅔&10 %
Hotchkiss .... dis 25 %
Peck, Stow & W. Co. .... dis 30&10 %

Butcher's Cleavers.
Humason & Beckley Mfg. Co. .... dis 25 %
Bradley's .... dis 25 %
Beatty's .... dis 25&5 %

1	2	3	4	5	6	7	8
$16.50	19.00	21.50	24.00	27.00	30.00	33.00	36.50

Calipers .... see Compasses

Can Openers.—Messenger's Comet, ℔ doz, $3.00 .... dis 25 %
American .... ℔ gross $6.00, dis 25 %
Duplex .... ℔ doz 25c. dis 15@20 %
Lyman's .... ℔ doz $3.75, dis 20 %
No. 4, French .... ℔ doz $2.25, dis 55 %
No. 5, Iron Handle .... ℔ gross $9.00, dis 25 %
Eureka .... ℔ doz $2.50, dis 10 %
Sardine Scissors .... ℔ doz $7.00, dis 55 %
Star .... ℔ doz $5.00, dis 25&5 %
Sprague, No. 1, $2.00; No. 2, $2.25; No. 3, $2.50 .... dis 50&10 %
"Worlds Best" ℔ gross, No. 1, $12.00; No. 2, $24.00; No. 3, $30.00 .... dis 50 & 10 %
Universal .... ℔ doz $3.00, dis 35 %
Domestic .... ℔ doz $2.50, dis 45 %
Champion .... ℔ doz $2.00, dis 50 %

Caps—Percussion, ℔ 1000.
Hicks & Goldmark's
F. L. Waterproof, 1-10's 50c
E. B. Trimmed Edge, 1-10's 65c
E. B. Ground Tr'md Edge, Central Fire, 1-10's .. 70c
Pistol Waterproof, extra heavy, 1-10's $1.10
Musket Caps, 1-10's .... 80c — dis 10&10
U. M. C., F. C. trimmed 50c
U. M. C., F. L. ground .... 70c — dis 10&10 %
U. M. C., Cen. fire ground 70c
U. M. C., Double W. Proof .... $1.40 — dis 10&5 %
G. D. & S. B. .... 33c, dis 10 %
Double Waterproof, in 1-10's $1.40
Colt's Pistol, in 1-10's .... 75c — dis 10 %
F. L. 50c
E. B. 1-10, trimmed 65c
E. B. 1-10, ground edge .... 70c — dis 10&5 %
Musket, in 1-10's .... 80c, dis 25 %

Cartridges.—Rim .... dis 75&5 %
Central Fire .... dis 45 %

Cards.—Horse and Curry new list, July, '81, dis 10 %
Cotton .... new list, July, '81, dis 10 %
Wool .... new list, July, '81, dis 10 %

Carpet Stretchers.
Cast Steel, Polished .... ℔ doz $5.00, dis 30 %
Cast Iron, Steel Points .... ℔ doz $2.00, dis 50&5 %
Socket .... ℔ doz $2.50, dis 25 %
Bullard's .... dis 25 %

Casters.—Bed .... dis 45@50 %
Plate .... 45@50 %
Shallow Socket .... dis 35&10 %
Deep Socket .... dis 25&10 %
Martin's Patent (Phoenix) .... dis 25 %

Cattle Leaders.
Humason, Beckley & Co.'s .... dis 70&10 %
Sargent's .... dis 70&10 %
Hotchkiss .... dis 25 %
Peck, Stow & W. Co. .... dis 33⅓&10 %

Chain.
Trace, 6½-10-2 .... ℔ pair 79c
Trace, 6½-10-3 .... ℔ pair 70c
Trace, 7-10-2 .... ℔ pair 86c — dis 35 %
German Halter Chain, list of Dec. 31, 1881 .... dis 50&5 %
German Coil, list of Dec. 31, 1881 .... dis 50&5 %
Covert Halter, Hitching and Breast .... dis 35&5 %
Oneida Halter Chain (old list) .... dis 45 %
Galvanized Pump Chain .... ℔ ℔ 9½c net
Jack Chain, Iron .... dis 60&10 %
Jack Chain, Brass .... dis 50&10 %

Chalk.
White .... ℔ gross 60c net
Red .... ℔ gross 80c net
Blue .... ℔ gross $1.00 net
White Crayons .... ℔ gross 11c net

Chalk Lines.—See Lines

Chisels.
Socket Framing, Crossman .... dis 65&5 %
Socket Framing, Arlington Edge Tool Co .. dis 65&10 %
Socket Framing, Buck Bros .... 1876 list, dis 22½ %
Socket Framing, Merrill .... dis 65&10 %
Socket Framing, Witherby Tool Co .... dis 65&10 %
Socket Framing, Douglass' .... dis 65&10 %
Socket Firmers, Crossman .... dis 65&5 %
Socket Firmers, Arlington Edge Tool Co .... dis 65&10 %
Socket Firmers, Buck Bros .... 1876 list, dis 22½ %
Socket Firmers, Merrill .... dis 65&10 %
Socket Firmers, Witherby Tool Co .... dis 65&10 %
Socket Firmers, Douglass' .... dis 65&10 %
Socket Corner .... dis 65&10 %
Tanged Firmers .... dis 40@45 %
Tanged Firmers, Butcher's .... $5.00@$5.25 to £
Tanged Firmers, Spear & Jackson's .... 5.00 to £
Tanged Firmers, Buck Bros (Shank) .... 5.25 to £
Globe Mfg. Co. .... dis 65&10 %

Clamps.
Iron, Providence Tool Co.'s Wrt. Iron .... dis 25 %
Iron, Adjustable, Gray's .... dis 20 %
Iron, Adjustable, Lambert's .... dis 20 %
Iron, Adjustable, Snow's .... dis 40&5 %
Iron, Adjustable, Hammer's .... dis 15 %
Iron, Adjustable, Stearns' .... dis 20&10 %
Iron, Cabinet, Sargent's .... dis 70&10 %
Iron, Carriage Makers', Sargent's .... dis 65&10 %

Clips, Axle.
Norway or Best .... dis 60&5 %
Superior .... dis 60&5 %

Cockeyes .... dis 55 %

Cocks, Brass.
Racking; Globe; Plain Bibbs; Ale and Beer .... dis ... 55 %

Coffee Mills.
Board and Box .... dis 45@50 %
Wilson's .... dis 45@50 %
Selsor's Pat .... $9.50, $10.50, dis 25 %
American (Enterprise Mfg. Co.) .... dis 20&10 %
The "Swift" (Lane Bros.) .... dis 20&10 %
Webb's Patent .... dis 45@50 %

Combined Dinner Pail and Lantern.
Per doz $15.00 .... dis 30 %

Compasses, Dividers, &c.
Compasses .... dis 55 %
Calipers .... dis 55 %
Dividers .... dis 55 %
Bemis & Call Co.'s Dividers .... dis 60&5 %
Bemis & Call Co.'s Compasses and Callipers .. dis 50&5 %
Bemis & Call Co.'s Wing & inside or outside .. dis 50&5 %
Bemis & Call Co.'s Double .... dis 60 %
Bemis & Call Co.'s (Call's Patent Inside) .... dis 30 %
Excelsior .... dis 50 %
Cook's Extension .... dis 25 %
J. Stevens & Co's Calipers and Dividers .... dis 25&10 %

Coopers' Tools.
Bradley's .... dis 10 @ 20 %
Barton's .... dis 20 %

Corkscrews.—Humason & Beckly Mfg. Co. dis 33⅓ %
Clough's Pat .... dis 33⅓ %

Corn Knives and Cutters.—Bradley's .. dis 10 %
Wadsworths .... dis 25 %

Crow Bars.
Cast Steel .... ℔ ℔ 6¼c
Iron, Steel Points .... ℔ ℔ 5 c

Curling Irons, &c.
⅜, ⅝, ¾ in., $1.80, 2.00, 2.40 .... dis 10 %
Curling Tongs .... ℔ doz $3.65, dis 10 %
Pinching Irons .... ℔ doz $7.50, dis 20 %

Curry Combs.
Fitch's .... dis 50&10 %
Hotchkiss, Novelty, new list, July 1880 .... dis 25 %
Hotchkiss, Exclr. Supr. Champion .... dis 25 %
Rubber .... ℔ doz $10.00, dis 25 %

Curtain Pins.
Silvered Glass .... net
White Enamel .... net

Cutlery.
Meriden Cutlery Co. (Table) .... net
Am. Miller Bro.'s Cutlery Co. .... dis 25 %
Humason & Beckley, Pocket .... dis 33⅓ %
Naugatuck Cutlery Co .... list net
Aaron Burkinshaw's Pocket .... dis 25 %

Dividers .... see Compasses

Dog Collars.—Embossed Gilt .... dis 30&10 %
Leather .... dis 40 %
Brass .... dis 40 %

Door Springs.
Torrey's Rod, regular size, ℔ doz., $3 .... dis 50 %
Gray's Rod .... dis 15 %
Bee Rod .... dis 15 %
Warner's .... dis 30 %
Gem (Coil):
No. 1, Large Japanned .... ℔ doz $4.00
No. 2, Medium, Japanned .... ℔ doz 2.75
No. 3, Small, Japanned .... ℔ doz 2.00 — dis 50 & 10 %
Star (Coil)—For Cop'd, Nickel-Plated &c., see list.
No. 4 ("Shoo Fly") Screen door size, ℔ doz $1.50
No. 5, Screen Door size .... ℔ doz 2.00
No. 6, Medium .... ℔ doz 2.75
No. 7, Large .... ℔ doz 4.00 — dis 60 %
Sabin's Lever .. No. 1, $1; 2, $1.50; 3, $2; 4, $2.50 .dis 35 %
Sabin's Boss. No. 1, ℔ doz. $4.00; 2, $2.75; 3, $2. dis 33⅓ %
Sabin's Crown .... ℔ doz $1.50. dis 33⅓ %
Philadelphia .... 5 in., $5.00; 8 in., $7.75, dis 35 %
Cowell's .... No. 1, ℔ doz. $18.00; No. 2, $15.00, dis 50 %
Rubber, complete .... ℔ doz. $1.80, dis 10 %
Hercules .... dis 50 %

Drawing Knives.
Arlington Edge Tool Co. .... dis 65&10 %
Crossman's No. 1 .... dis 65&5 %
Morrill .... dis 65&10 %
Nobles Mfg. Co. .... dis 15 %
Bradley's .... dis 35 %
Adjustable Handle .... dis 20 %
Witherby Tool Co. .... dis 65&10 %
Douglass .... dis 65&10 %
Globe Mfg. Co. .... dis 65&10 %

Drills and Drill Stocks.
Blacksmiths' .... each, $2.50, dis 10 %
Blacksmiths' Self-Feeding .... each, $7.50, dis 20 %
Breast, P. S. & W .... dis 20&10 %
Breast, Hotchkiss' .... dis 20 %
Breast, Wilson's .... dis 20 %
Breast, Millers Falls .... each, $3.00, dis 25 %
Breast, Bartholomew's .... each, $2.50, dis 25&10 %
Ratchet, Merrill's .... dis 10 %
Ratchet, Ingersoll's .... dis 25 %
Ratchet, Whitney's .... dis 20 %
Ratchet, Weston's .... dis 20 %
Ratchet, Moore's Triple Action .... dis 20&25 %
Whitney's Hand Drill, Plain, $11.00 Adjustable, $12.00 .... dis %
Wilson's Drill Stocks .... dis 10 %
Automatic Boring Tools .... each, $2.25, dis 20 %

Drill Chucks.
Morse's Beach Patent .... dis 30 %
Morse's Adjustable .... each, $10.00, dis 30 %
Danbury .... each, $8.00, dis 30 %

Egg Beaters.
Dover .... ℔ doz. $2.50, dis 2 %
Monroe's .... dis 50 %
National .... ℔ doz. $4.50, dis 33⅓ %
Standard .... ℔ gross, $18.00, dis 25 %
Family (T. & S. Mfg. Co.) .... ℔ gross, $18.00, net
Acme .... ℔ gross, $12.00, dis 25 %
Triumph (T. & S. Mfg. Co.) .... ℔ gross, $41.50, net

Elevator Buckets.
Mill E. Buckets, light, 3½ to 10 in. (Duc's Improved), ℔ 100, $15.00 @ $54.00 .... dis 10 %
Mill E. Buckets, heavy 5 to 10 in. (Duc's Improved), ℔ doz. $4.60 @ $10.20 .... dis 10 %
Storehouse (Duc's Patent), 12 to 17, $12 @ $20 .... dis 10 %

Emery and Emery Paper.
Regular numbers .... ℔ ℔ 6c
Flour and F. F .... ℔ ℔ 4c
B. & A. Emery Paper .... dis 30&5 %
Sibley's Emery and Crocus Cloth, large size, $10; medium, $10.50 ℔ ream .... dis 15 %

Enameled and Tinned Ware.
Kettles .... dis 50 %
Sauce Pans .... dis 25 %
Tinned Sauce Pans .... dis 25 %

Escutcheon Pins.
Brass .... dis 50 %

Escutcheons.
Door Lock .... Same discounts as Door Locks
Brass Thread .... dis 55 %
Wood .... dis 25 %

Faucets.
Fenn's .... dis 40 %
Bohren's Patent Rubber Ball .... dis 25 %
Fenn's Cork Stops .... dis 33⅓ %
Star .... dis 55&10 %
Frary's Patent Petroleum .... dis 20&10 %
West's Patent Key .... dis 45 %
Anchor Lock .... dis 45 %
Metallic Key, Leather Lined .... dis 60 %
Cork Lined .... dis 70 %
J. Sommer's Best Metallic Key .... dis 40&10 %
J. Sommer's Cork Lined, 1st quality .... dis 50 %
Self-Measuring, Enterprise .... ℔ doz. $30.00, dis 20&10 %
Self-Measuring, Lane's .... ℔ doz. 36.00, dis 20&10 %
Self-Measuring, Victor .... ℔ doz. $36.00, dis 25&10 %

Felloe Plates .... ℔ ℔, 10c, dis 25 %

Files.
J. & Riley Carr .... new list April 1, '83, dis 15 %
J. & Riley Carr Horse Rasps .... dis 10 %
Butcher's ....
Moss & Gamble .... new list, dis 15 %
H. Disston & Sons .... dis 45 %
Nicholson .... dis 45 %
New American .... dis 45 %
Union File Co. .... dis 45 %
Heller Bros.' Files .... dis 45 %
Heller Bros.' Horse Rasps .... dis 35 %
Western .... dis 45 %
Stubs .... new list, dis 25@30 %

Fluting Machines.
Knox, 4½-inch Rolls .... $3.50 each
Knox, 6-inch Rolls .... $4.00 each — dis 35 %
Eagle, 3½-inch Roll .... $2.15, dis 35 %
Eagle, 5½-inch Roll .... 2.85, dis 35 %
Crown, 4½-in., $3.50; 6-in., $4.00; 8-in., $6.50 each, dis 35 %
Crown Jewel .... 6-in., $3.40 each, dis 25 %
American, 5-in., $3; 6-in., $3.40; 7-in., $4.50 each, dis 34 %
Domestic Fluter .... $1.50 each, net
Geneva Hand Fluter, White Metal .. ℔ doz $12, dis 25 %
Crown Hand Fluter, Nos. 1, $15; 2, $12.50; 3, $10.00 ℔ doz .... dis 30 %
Shepard Hand Fluter, No. 85 .... per doz $15, dis 40 %
Shepard Hand Fluter, No. 110 .... per doz $8.75, dis 30 %
Shepard Hand Fluter, No. 95 .... per doz $6.50, dis 20 %
Clark's Hand Fluter .... ℔ doz $15.00, dis 33⅓ %
Combined Fluter and Sad Iron .... ℔ doz $15.00, dis 30 %
Buffalo .... ℔ doz $10.00, dis 10 %

Fluting Scissors .... dis 45 %

Fly Traps.
Paragon .... ℔ doz, $3, net

Forks.
Hay, Manure and Spading .... dis 50&10 %
Plated, A 1, Rogers & Bro .... dis 40&10&5 %
Plated, Reed & Barton .... dis 40&10&5 %

Fruit and Jelly Presses.
Enterprise Mfg. Co. .... dis 25 %

Fry Pans.
Burnished list as follows .... dis 60&10&5 %

No	0	1	2	3	4	5	6	7	8
℔ doz	$3.00	3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00

"Acme" .... dis 40&10 %

Gauges.
Marking Stanley's .... dis 50&10 %
Marking, Chapin's .... dis 55&10 %
Wire .... dis 70&10 %
Wire, Disston's .... dis 20 %
Wire, Wheeler, Madden & Co .... dis 10 %

Gimlets.
Nail and Spike .... dis 40&10 %
"Eureka" Gimlets .... dis 40&10 %
"Diamond" Gimlets .... dis 40&10 %
Double Cut, Shepardson's .... dis 40&10 %
Double Cut, Hartwell's .... dis 40&10 %
Double Cut, Ives' .... dis 40&10 %
Double Cut, Douglass' .... dis 40 %
"Bee" .... ℔ gro. $12.00, dis 25 %

Glue Pots.
Tinned and Enameled .... dis 25&5 %
Family, Howe's "Eureka" .... dis 25 %
Family, L. F. & C.'s "Handy" .... dis 30 %

Grindstone Fixtures.
Sargents Patent .... dis 70&10 %
Reading Hardware Co. .... dis 30&10 %

Gun Wads.
U. M. C. B. E., 11 up $2.00
U. M. C. B. E., 9&10 .... 2.30
U. M. C. B. E., 7&8 .... 2.60
U. M. C. P. E., 11 up 3.10
U. M. C. P. E., 9&10 .... 4.00
U. M. C. P. E., 7&8 .... 4.90 — dis 5&5 %

Halters.
Covert's Pat. Rope .... dis 50 %
Horse and Cattle Ties Covert's .... dis 50 %

Hammers.
Maydole's .... dis 15 %
Cheney's, new list, March, 1883 .... dis 20&5 %
Hartford Hammer Co. (new list July 1, '81) .... dis 20 %
Humason & Beckley .... dis 15 %
Verree .... dis 5 %
Magnetic Tack, Nos. 1, 2, 3, $1.26, 1.50 and 1.75, dis 25&10 %
Nelson Tool Works .... dis 40&10 %
Warner & Noble's .... dis 5 %
Yerkes & Plumb .... dis 15 %
Wilkinson's Smiths' .... 11½c ℔ ℔ net

Hand Cuffs and Leg Irons.
Providence Tool Co., Hand Cuffs, $15.00 ℔ doz. dis 10 %
Providence Tool Co., Leg Irons, $25.00 ℔ doz .... dis 10 %
Tower's .... dis 25 %

Handles.—Door or Thumb Latches.

Nos	0	1	2	3	4	
Per doz	$0.80	1.00	1.18	1.35	1.60	dis 60&10 %

Roggin's Latches .... ℔ doz 35c. @ 40c. net
Bronze Iron Drop Latches .... ℔ doz $0.90 @ 1.10
Jap'd Store Door Handles—Nuts, $1.62; Plate, $1.10; no Plate, $0.88 .... dis 10 %
Barn Door .... ℔ doz $1.60, dis 10&10 %
Wrought Chest .... dis 70 %
Surface Chest .... dis 60&10 %
Flush Chest .... dis 60&10 %
Lifting .... dis 55&10 %
Saw and Plane .... dis 40&10 %
Boynton's Loop Saw Handles .... 50c. dis 50 %
Boynton's Centennial Saw Handles .... 30c. dis 25 %
Hammer and Hatchet .... dis 20 %
Bard Awl .... ℔ gross, $1.00 dis 10 & 20 %

Hickory Firmer Chisel, assorted, ℔ gross .. $4.50
Hickory Firmer Chisel, large, ℔ gross 5.00
Apple Firmer Chisel, assorted, ℔ gross 5.00
Apple Firmer Chisel, large, ℔ gross 6.00
Socket Firmer Chisel, assorted, ℔ gross 3.00
Socket Framing Chisel, assorted, ℔ gross .. 5.00
File assorted, ℔ gross 2.75
Auger, assorted, ℔ gross 5.00
Auger, large, ℔ gross .... 7.00 — dis 20&10 @ 25&10
Patent Auger, Ives' .... dis 25 %
Patent Auger, Douglass' .... ℔ set $1.25 net
Patent Auger, Swan's .... ℔ set $1.00 net

Hangers.
Barn Door, old patterns .... dis 60&10 %
Barn Door, New England .... dis 65&10 %
Climax (Anti-Friction) .... dis 50 %
Challenge .... dis 50 %
"Champion" Medina Mfg. Co. .... $15; dis 50&10 %
Sterling Improved (Anti Friction) .... dis 65&10 %
Cheritree .... dis 50 %
Kidder's .... dis 50&5 %
U. S. .... 4 in., $12; 5 in., $15; dis 60 %
The "Boss" .... dis 50&10 %
Terry's Patent .... 5 in., $12; 3½ in., $10; dis 40 %
Cronk .... No. 4, $12; No. 5, $14.40; No. 6, $21; dis 50

Harness Snaps.
Anchor (T. & S. Mfg. Co.) .... dis 60 %
Henshaw's, list of 1½ changed to $14.00 .... dis 60 %
Judd's, list of 1½ changed to $14.00 .... dis 60 @ 65 %
Fitch's (Bristol), list of 1½ change to $14.00 .dis 60 @ 65 %
Hotchkiss' .... dis 10 %
Andrews' .... dis 50 %
Sargent's .... dis 70&10 %
German, low list, Sep., 1882 .... dis 33⅓ %
German, Sargent's new list .... dis 60&10 %
Covert .... dis 50 %
Covered Spring, new list, Oct., 1882 .... dis 60&10 %

Hatchets.
Isaiah Blood .... dis 30 @ 35 %

	Nos.				
Shingling,	Nos. 1 2 3	℔ doz	$7.25	$8.00	$8.75
Claw,	Nos. 1 2 3	℔ doz	7.75	8.50	9.25
Lathing,	Nos. 1 2 3	℔ doz	7.50	8.00	8.50

Hunt's .... dis 25 %

Shingling,	Nos. 1 2 3	℔ doz	$7.25	$8.00	$8.75
Claw,	Nos. 1 2 3	℔ doz	7.75	8.50	9.25
Lathing,	Nos. 1 2 3	℔ doz	7.30	8.25	9.00

Hurd's .... dis 30 @ 35 %

Shingling,	Nos. 1 2 3	℔ doz	$8.00	$8.50	$9.00
Claw,	Nos. 1 2 3	℔ doz	9.00	9.50	10.00
Lathing,	Nos. 1 2 3	℔ doz	8.00	8.50	9.00

Yerkes & Plumb .... dis 30 @ 35 %

Shingling,	Nos. 1 2 2	℔ doz	$7.50	$8.00	$8.50
Claw,	Nos. 1 2 3	℔ doz	8.25	8.75	9.25
Lathing,	Nos. 1 2 3	℔ doz	7.50	8.00	8.50

Simmons' .... dis 30 @ 35

Shingling,	Nos. 0 1 2 3	℔ doz	$7.50	$8.00	$8.50	$9.00
Claw,	Nos. 0 1 2 3	℔ doz	....	8.50	9.00	9.50
Lathing,	Nos. 0 1 2 3	℔ doz	....	8.00	8.50	9.00
Broad,	Nos. 1 2 3 4	℔ doz	9.00	10.00	12.00	14.00
Broad,	Nos. 5 6 7 8	℔ doz	16.00	18.00	20.00	22.00

Collins .... dis 10

Shingling,	Nos. 1 2 3	℔ doz	$5.50	$6.00	$6.50
Claw,	Nos. 1 2 3	℔ doz	6.00	6.50	7.00
Lathing,	Nos. 1 2 3	℔ doz	5.50	6.00	6.50

Peck's Champion Blade .... dis 30 @ 35 %

Shingling,	Nos. 1 2 3	℔ doz	$8.00	$8.50	$9.00
Lath,	Nos. 1 2 3	℔ doz	8.00	8.50	9.00
Claw,	Nos. 1 2 3	℔ doz	9.00	9.50	10.00
Half,	Nos. 1 2 3	℔ doz	8.00	8.50	9.00
Ax Pattern,	Nos. 1 2 3	℔ doz	10.00	11.00	12.00

Hay Knives.
"Lightning" .... ℔ doz $20.00 dis 10 %
Wadsworth's .... dis 33⅓ %

Hinges.
Gate, Western .... ℔ doz $4.90 dis 55 %
Gate, N. E. .... ℔ doz $7.70, dis 55 %
Gate, N. E. Reversible .... ℔ doz $6.45, dis 55 %
Gate, Clark's, Nos. 1 2 3 .... dis 50 %
Gate, N. Y. State .... ℔ doz $5.05, dis 45&10 %
Gate, Automatic .... ℔ doz $12.50, dis 50 %
Gate, Common Sense .... ℔ doz pair $4.50, dis 50 %
Gate, Seymour's .... dis 45&10 %
Gate, Shepard's .... Nos. 1, 2, 3, 10, 20 & 25, dis 50&10 %
Rolled Blind Hinges .... dis 60&10 %
Rolled Plate .... dis 60&10 %
Rolled Raised .... dis 60&10 %
Plate Hinges "Providence" 8, 10 & 12 in., $5.55 ℔ 100 ℔; over 12 in., $4.50 ℔ 100 ℔ .. dis 10 %
Screw Hook and Strap 8, 10, 12 in., $7.00 ℔ 100 ℔; 14 to 36 in. $5.75 ℔ 100 ℔ .. dis 10 %
Heavy Welded Hook 8 to 12 in., $7.00 ℔ 100 ℔; 14 in & up, $5.50 ℔ 100 ℔ .. dis 10 %
Screw Hook and Eye .... ⅝ & 1 in. 9c; ¾ in., 9c; ⅝ in., 10c; ½ in., 12c — dis 20 %
Wrought Strap and T .... dis 55&10 %

Hoes.
Riveted Shank .... ℔ doz $5.00, dis 55 %
Socket .... ℔ doz $5.25, dis 55 %
Grub .... ℔ doz $11 dis 35 %
Planters' .... dis 50 %
Scovill Pattern .... dis 50 %
Handled Planters' .... dis 50&10 %
Hick's Pat. Solid C. S. Planters' .... dis 20&10&30 %
Hick's Pat. Solid C. S., Scovill Pattern .... dis 20&5&35 %
Winsted & Lane, Planters' .... dis 25 %
Winsted & Lane, Scovill Pattern .... dis 20&25 %
Magic .... ℔ doz $5 net

Hooks.
Bird Cage, Sargent's list .... dis 60&10 %
Bird Cage, Reading .... dis 40&10 %
Cotton .... ℔ doz $4.00, dis 30 %
Cotton Patented (N. Y. Mallet & Handle W'ks), dis 30 %
Cotton (Humason & Beckley Mfg. Co) .... dis 40 %
Belt .... dis 60&10
Bench—Hotchkiss' $5.00 ℔ doz .... dis 10 %
Weston's, No. 1, $10.00; No. 2, $9.00 ℔ doz .... dis 25
McGill's, $3.00 ℔ doz .... dis 10 %
Clothes Line, Sargent's list .... dis 65&10 %
Clothes line, Reading list .... dis 45&5&10 %
Ceiling, Sargent's list .... dis 60&10&10 %
Harness, Reading list .... dis 40&10&10 %
Coat and Hat, Sargent's list .... dis 60&10&10 %
Coat and Hat, Reading .... dis 40&10&10 %
Wire Coat and Hat, Gem .... dis 3 &10 %
Wire Coat and Hat, Miles' .... dis 70 %
Picture Hooks, Brown's Pat. Solid Brass, $4.00 ℔ gross .... dis 25 %
Tassel and Picture (T. & S. Mfg. Co.) .... dis 50 %
Wrought Staples and Hooks & Staples .. dis 70&7½&10 %
Wrought Staples, Stanley's list .... dis 70&7½&10 %
Wire Screw Hooks and Eyes .... new list, dis 70&10 %
Grass and Bush .... dis 45@50 %
Whiffletree—Patent .... dis 40 %
Hooks and Eyes—Malleable Iron .... dis 60&10 %
Hooks and Eyes—Brass .... dis 60&10 %

Horse Nails.

	Nos. 5	6	7	8	9	10	
Ausable, ℔ ℔	31c	28c	26c	25c	24c	23c	dis 30&10 %
Clinton, Plain, ℔ ℔	23c	21c	20c	19c	18c		dis 30&10 %
Clinton, Fin., ℔ ℔	24c	22c	21c	20c	19c		dis 30&10 %
Essex, ℔ ℔	31c	28c	26c	25c	24c	23c	dis 30&10 %
Putnam "	27c	24c	22c	21c	20c	19c	dis 5&7 %
Vulcan, "	26c	23c	21c	20c	19c	18c	dis 12½ %
Globe, "	24c	21c	19c	18c	17c	16c	dis 12½ %
A. C., "	26c	23c	21c	20c	19c	18c	dis 10&10 %
Ch'mpl'n Forged "	31c	28c	26c	25c	24c	23c	dis 30 %
New Haven, "	31c	28c	26c	25c	24c	23c	dis 30&10 %
Bridgewater, "	24c	21c	19c	18c	17c	16c	dis 25 %
Saranac, "	26c	23c	21c	20c	19c	18c	dis 30 %

Horse Shoes.
Burden .... ℔ keg $4.37½
R. I. Horse Shoe Co., Perkins' Improved Light, Medium and Heavy .... ℔ keg $4.37½
Walker's Forged, Light, Med. or Heavy .. ℔ keg $4.37½
Mule Shoes .... ℔ keg $5.37½
Dunning's Steel .... ℔ keg $9.25

Ice Awls, Chisels, &c.
American Ice Chisel .... ℔ doz $3.00 net
National Ice Chisel .... ℔ doz $6.25 dis 20 %
Novelty Ice Breakers .... ℔ doz. $6.25 dis 20 %
White's Sliding Head Picks .... ℔ doz $2.50 dis 40 %
Dunlap's Ring Picks .... ℔ doz $2.00 dis 20 %
Wood Head Picks, Sargent's .... ℔ doz $1.60 dis 50&10 %
Iron Head Picks, Sargent's .... ℔ doz $1.25 dis 50&10 %
Ice Mallets, Pick in head .... ℔ doz $1.75 dis 15 %
Ice Mallets, Pick in Handle .... ℔ doz $2.00 dis 15 %
Ice Axes, Small Cast or Malleable .. ℔ doz $1.20 dis 10 %
Combination Ice Tools .... ℔ doz $2.00 net

Ice Cream Freezers.
Amn. Mch. Co. .... dis 40 %
Torrey's .... dis 40 %
Packer's .... dis 40 %

Ice Creepers.
Safety Reversible .... ℔ gross $25
Arctic Solid .... ℔ gross $30 — dis 10 %

Ice Tongs.
Champion .... ℔ doz $6.00 dis 30&10 %
Family .... ℔ doz $2.75 dis 15 %

Kettles.
Brass, 7 to 13 inches inclusive .... ℔ ℔ 28c net
Brass larger than 13 inches .... ℔ ℔ 32c net

Knives.
Ames' Butcher Knives .... dis 20 %
Ames' Shoe Knives .... dis 15 %
Ames' Bread Knives .... ℔ doz $1.50 dis 15 %
Moran's Shoe and Bread Knives .... dis 20 %
Hay and Straw, Wadsworth's .... dis 33⅓
Table and Pocket .... See Cutlery

Knobs.
Carriage (Jap'd 80c ℔ gross) .... dis 60&10 %
Base—Common .... dis 30&10 %
Hemacite Door Knobs .... new list, dis 35&5 %
Door Mineral; Door Por. Jap'd; Door Por. Plated; Door Por. .... Same discounts as Door Locks.
Furniture Plain .... 75c gross inch, dis 10 %
Furniture, Wood Screws .... dis 20 %
Picture, Judd's .... dis 60&10&10 %
Picture, Sargent's .... dis 60&10 %
Hemacite, Picture .... dis 35 %
Shutter, Porcelain .... dis 60&10 %

Ladles.
Melting, Sargent's .... dis 50&10 %
Melting, Reading .... dis 30&10 %
Melting, Monroe's Patent .... ℔ doz $4.00 dis 40 %
Melting, P. S. & W. .... dis 30&10 %

Lanterns.
Tubular .... No. 0, $7.50; No. 1, $9.00; With Guards, 40c extra — net
Nail City .... No. 1 ℔ doz $10; No. 2, $9, net
Meteor .... No. 1, ℔ doz, $9.50; No. 2 $8.50, net
Hurricane, No. 2 .... ℔ doz $5.75, net
Peerless, No. 5 .... ℔ doz $11.75, dis 10&10 %
Brady's Patent .... dis 10&10 %
Ætna .... dis 10&20 %
Yankee .... dis 10&10 %
De Beque .... dis 10&10 %
Police Small, $6.25; Med., $7.50; Large, $10.00, net
Convex Reflector .... $8.75 ℔ doz, dis 15 %

Lawn Mowers.
Excelsior and Clipper .... dis 33⅓ %
Pennsylvania .... dis 30 %
Philadelphia .... dis 30 %

Lemon Squeezers.
Porcelain Lined .... ℔ doz $6.00, dis 30 %
Wood .... ℔ doz 3.00, dis 30 %
Eureka, Tinned .... ℔ doz 8.00, dis 10 %
Dunlap's Improved .... ℔ doz 2.75, dis 20 %
Sammis' .. No. 1, $5; 2, $8.40; 12, $15 ℔ doz; dis 25&10 %
Townsend's Patent .... $6.00 ℔ doz, dis 33⅓ %
Jennings "Star" .... $2.00 ℔ doz net
The "Boss" .... ℔ doz $4.00, dis 10&10 %
Dean's Nos. 1, ℔ doz, $15.00; 2, $9.00; 3, $5.00 dis 40&10 %

Lines.—Linen Fish .... dis 25&10 %
Cotton Chalk .... dis 55 %
Silver Lake, Braided, Nos. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ℔ gross .... dis 20 %
Masons' Linen, No. 3½, $1.50; No. 4, $2; No. 4½, $2.50 .... net
Masons' Colored Cotton .... dis 45 %
Wire Clothes, Galvanized .... each 25c@40c net

Locks and Latches.
Cabinet, Eagle; Cabinet, Gaylord; Cabinet, Bridgeport .. Changes made in list price of some numbers Jan. 1, 1881, dis 40 %
Cabinet, P. & F. Corbin .... dis 25&2 %
Cabinet, A. E. Deitz .... dis 30 @ 40 %
Cabinet, Stoddard Lock Co .... dis 40&5 %
Trunk, new list, Jan. 1, 1881 .... dis 15&2 %
Langstroth & Crane's List, Jan. 1, '77:
Round Key, Nos. 1 to 5 .... dis 40&10 %
Round Key, Nos. 5½ to 12 .... dis 40&10 %
Flat Key .... dis 33⅓&10 %
A. E. Deitz, Flat Key .... dis 30@40 %
Yale Lock Co., Flat Key .... dis 40 %
"Shepardson" or "U. S." .... dis 35 %
"Felter" or "American" .... dis 33⅓ %
Plate .... dis 33⅓&2 %
F. Many's "Extension Cylinder" .... $10.50 ℔ doz net

DOOR LOCKS, ETC.

Branford; Norwalk; Norwich; P. & F. Corbin; Russell & Erwin; Mallory, Wheeler & Co.; Whipple Mfg. Co. — Circular Prices: Revised list of June 14, 1883, dis 50 % and 2 % for cash.
Reading Hardware Co. (low list) .... dis 40&2 %
Padlocks—Russell & Erwin; Mallory, Wheeler & Co.; Norwich Lock Mfg. Co.; Wm. Wilcox & Co. — dis 30&10 % and 2 % for cash
Yale Lock Mfg. Co.'s "Standard" .... dis 40 %
Romer's .... dis 25 @ 40 %
Conestoga .... dis 60 %
Scandinavian (Moore Bros.) .... dis 80 %
J. H. McWilliams .... dis 10 %
A. E. Dietz .... dis 35 %
"Star" .... dis 45 %

Lustro.—4-oz. bottles, ℔ doz $1.75; ℔ gros $17.00 net

Mallets.—Hickory .... dis 10&10 %
Lignumvitæ .... dis 10&10 %
Penfield Block Co., Lignumvitæ & Hickory .. dis 30 %

Meat Cutters.
Dixon's (P.S.&W.) Nos. 1 2 3 4 ℔ doz .. $14.00 17.00 19.00 30.00—dis 25&5 %
Miles' Challenge .... Nos. 1 2 3 ℔ doz .. $22.00 30.00 40.00—dis 40 %
Perry's. Nos. 1 2 3 4 4 g'rd 5 g'rd Each .. $3.00 4.00 5.00 11.00 13.00 36.00—dis 25&5 %
Woodruffs (P. S. & W.) .... Nos. 100 190 ℔ doz .. $15.00 18.00—dis 25&5 %
Hales' .... Nos. 11 12 13 ℔ doz .. $27.00 35.00 45.00—dis 50&10&2 %
Draw Cut .. Nos. 5 2 6 8 10 Each .. $50.00 75.00 80.00 225.00 400.00—dis 20 %
American .... dis 20&10 %
Nos. 1 2 3 4 B 5 Each $5.00 7.00 10.00 25.00 50.00 60.00
Kieser's No. 55 .... $40 ℔ doz, dis 40 %
Kieser's Gem .... $25 ℔ doz, dis 40 %
Kieser's Monarch .... $45 ℔ doz, dis 40 %
Kieser's Butcher .... $40 each, dis 20 %
Silver & Deming .... dis 25 %
Pennsylvania .... dis 40&10 %
Nos .... 1 2 3 00 ℔ doz $24.00 28.00 36.00 28.00
Beef Shavers (Enterprise Mfg. Co.) .... dis 20&10 %

Mincing Knives.
Am. (2d quality), ℔ gross, 1 blade, $7; 2 blades, $12; 3 blades, $18 .... net
Lothrop's .... dis 20&10 %
Smith's, ℔ doz, Single, $2.25; Double, $3 .. dis 33⅓&10 %
Cowles Hdw. Co. .... dis

Molasses Gates
Stebbins Patterns .... dis 70&10 %
Stebbins Genuine .... dis 67½&10 %
Stebbins Tinned Ends .... dis 40&10 %
Chase's Hard Metal .... dis 50&10 %
Bush's .... dis 20 %
Lincoln's Pattern .... dis 60&10 %
Weed's .... dis 15 %
Boss Nos. 1 2 3 4 $7.00 8.00 9.00 10.00 .. ℔ doz. dis 60&10&10 %

Nails .... See Trade Report

Nuts and Washers.—(In lots less than 100 ℔ ℔ add ½c to list; 1 lb. boxes, add 1c to list.)
Square Nuts .... 8 c off list
Hexagon Nuts .... 8½c off list
Washers .... 7½c off list

Nut Crackers.
Table (Humason & Beckley Mfg. Co.) .... dis 33⅓ %
Blake's Pattern .... ℔ doz $2.00, dis 5 %
Turner & Seymour Mfg. Co. .... dis 50 %

Oakum.—is on 100 bales and over ⅛ % ℔ ℔.
Best .... ℔ ℔ 9 c
U. S. Navy .... ℔ ℔ 8 c
Navy .... ℔ ℔ 6½c

Oilers.—Zinc and Tin .... dis 60 %
Brass and Copper .... dis 50 %
Malleable (Hammer's) .... ℔ doz. $5.00, dis 10 %
Prior's Patent or "Paragon" Zinc .... dis 60 %
Prior's Patent or "Paragon" Brass .... dis 60 %
Olmstead's, Tin and Zinc .... dis 60 %
Olmstead's, Brass and Copper .... dis 50 %
Broughton's, Zinc .... dis 60 %
Broughton's, Brass .... dis 50 %

Packing, Steam.
N. Y. Belting and Packing Co. .... dis 20 %

Pencils.
Faber's Carpenters' .... high list, dis 50 %
Faber's Round Gilt .... ℔ gross $5.25, net
Dixon's Lead .... ℔ gross $4.50, net
Dixon's Lumber .... ℔ gross $6.75, net
Dixon's Carpenters' .... dis 40&10 %

Picks.
Railroad, 5 to 6, $11.00; 6 to 7, $12.00 .... dis 50 %
Adze Eye, 5 to 6, $12.00; 6 to 7, $13.00 .... dis 50 %

Picture Nails.
Brass Head, Sargent's list .... dis 50&10 %
Brass Head, T. & S. Mfg. Co. .... dis 50 %
Porcelain Head, Sargent's list .... dis 50&10 %
Porcelain Head, Judd's list .... dis 40@40&10 %
Porcelain Head, T. & S. Mfg. Co .... dis 40 %
Niles' Patent .... dis 40 %

Pinking Irons .... ℔ doz 75c, net

Plaiting Machines.
Magic .... ℔ doz $10.00, net
Astor Plaiting Machine .... each $15.00, dis 20 %
Crown Plaiting Machines .... dis 25 %
6 in., $6.00; 10 in., $8.00 each.

Planes and Plane Irons.
Bench, First Quality .... dis 20 %
Bench, Second Quality .... dis 25 %
Molding .... dis 15 %
Bailey's (Stanley R. & L. Co.) new list, Jan. '79, dis 20&10 %
The Stanley (S. R. & L. Co.) new list, Jan. '79 .. dis 20&10 %
Bailey's "Victor" .... dis 20&10 %
Defiance Adjustable .... dis 20&10 %
Laflin Mfg. Co. .... dis 30 %
Plane Irons, Butcher's .... $5.00 @ $5.25 to £
Plane Irons, Buck Bros .... $5.00 to £
Plane Irons, Auburn Tool Co. .... dis 20 & 10 %
Plane Irons, The Globe Mfg. Co., "Baldwin Iron" .... dis 20 & 10 %
Plane Iron, Ohio Tool Co. .... dis 20&10 %
Plane Irons, Sandusky Tool Co. .... dis 20&10 %

Pliers and Nippers.
Button's Patent .... dis 33⅓ %
Hall's Pat. Compound Lever Cutting Nippers, No. 2, 5 in., $14.50; No. 4, 7 in., $21.00 ℔ doz .... dis 25 %
Humason & Beckley Mfg. Co. .... dis 30&10 %
Gas Pliers .... dis 50 %
Eureka Pliers and Nippers .... dis 40 %
Russell's Parallel .... dis 25 %
P. S. & W. Cast Steel .... dis 33⅓&10 %
P. S. & W. Tinners' Cutting Nippers .... add 6 % dis 10 %

Plumbs and Levels.
Disston's .... dis 40 %
Stanley R. & L. Co.'s Pat. Adjustable .... dis 65&10 %
Stanley R. & L. Co.'s Non-Adjustable .... dis 65&10 %
Chapin's Patent Adjustable .... dis 65&10&10 %
Chapin's Non-Adjustable .... dis 65&10&10 %
Standard Rule Co.'s New Adjustable .... dis 65&10 %
Standard Rule Co.'s Non-Adjustable .... dis 65&10 %
Johnson's Patent Adjustable .... dis 65&10 %
Pocket Levels .... dis 65&10 %
Davis' Inclinometers .... dis 20 %

Post Hole and Tree Augers.
Samson Post Hole Digger .... ℔ doz $37.50, dis 20 %
Fletcher Post Hole Augers .... ℔ doz $36.00, dis 20 %
Vaughan's Post Hole—6 in., $23.60; 7, 8 and 9 in., $25.00 ℔ doz .... dis 20&10 %
Eureka Diggers ℔ doz $27.00 .... net
Leed's each $2.50 .... net

Pruning Hooks and Shears.
Disston's Combined Pruning Hook and Saw, ℔ doz $19.00, dis 20 %
Disston's Pruning Hook .... ℔ doz $12.50, dis 20 %
E. S. Lee & Co.'s Pruner .... dis 33⅓ %
Pruning Shears .... ℔ doz $4.50 @ 6.00
Wheeler, M. & Co.'s Combination .... ℔ doz $12, dis 20 %
Dunlap's Saw and Chisel .... ℔ doz $9.00, dis 40 %

Pulleys.
Hot House and Tackle .... dis 65&10 %
Jap'd Screw .... dis 65&10 %
Brass Screw .... dis 70&10 %
Jap'd Side .... dis 65&10 %
Jap'd Clothes Line .... dis 60&10 %
Hay Fork, Solid Eye .... $4.50; Swivel, $5.00, dis 50&10 %
Hay Fork, "Anti Friction" .... $6.75, dis 10&10 %
Hay Fork, "F" Common and Pat. Bushed .... dis 20 %
Hay Fork, Tarbox Pat. Iron .... dis 20 %
Shade Rack .... dis 45 %

Punches.
Belt or Drive .... ℔ doz $2.00; 2.25 2.50, dis 50 %
Bemis & Call Co.'s Cast Steel Drive .... dis 50&5 %
Bemis & Call Co.'s Springfield Socket .... dis 50&5 %

Spring.....₩ doz $7.00, dis 50&7½ %
Spring, Leach's Patent.....dis 15 %
Bemis & Call Co.'s Spring and Check.....dis 40 %
Solid, Tinners'.....₩ doz $1.44, dis 40 %

Rail.
Sliding Door, Wrought Brass. ₩ ℔ 130, dis 33⅓ %
Sliding Door, Bronzed Wrt. Iron....₩ foot 13c. dis 35 %
Sliding Door, Iron, Painted....₩ foot 4c. dis 10&10 %
Barn Door....Inch.....⅜ ½ ⅝
Per 100 feet $2.00 3.60 4.60—dis 10 %
R. D. for N. E. Hangers—
Small. Med. Large.
Per 100 feet.....$2.10 2.70 .30—net
Terry's Wrought Iron, 500 ₩ foot. . . . .net

Razors.
J. R. Torrey Razor Co.....dis 15 %

Razor Strops.
Genuine Emerson.....dis 45 %
Badger's Emerson.....dis
Badger's (not Emerson).....dis 33⅓ %
Imitation Emerson.....₩ doz $2.00, dis 20 %
Hunt's.....dis 40&5 %
Chapman.....dis 15 @ 20 %
Saunder's.....dis 10
Torrey's.....dis 2

Rivets.
Iron and Tinned, new list, Dec. 10, 1881.....dis 40 %
In bulk, new list, Dec. 10, 1881.....dis 30 %
Copper Rivets and Burrs.....dis 50 %
Nos.. 7 8 9 10 11 12 13 14 15
₩ ℔.. 49c 50c 52c 54c 56c 58c 60c 65c 70c

Rivet Sets.
.....dis 33⅓&10 %

Rods.
Stair, Brass.....dis 25 %
Stair, Black Walnut.....60c. ₩ doz. dis 10 %

Rollers.
Barn Door, Sargent's list.....dis 6c&10&10 %
Acme (Anti-Friction).....dis 50 %

Rope.
Mnfs' List, July 6, 1883.....dis 10 ₩ ℔
Manila.....⅝ inch and larger ₩ ℔ 16 c
Manila.....½ inch ₩ ℔ 16½c
Manila.....7/16 and 5-16 inch ₩ ℔ 17 c
Manila, Tar'd Rope.....₩ ℔ 15½c
Manila, Tar'd Lath Yarn.....₩ ℔ 15½c
Manila, Hay Rope.....₩ ℔ 16 c
Sisal.....⅝ inch and larger ₩ ℔ 11 c
Sisal.....⅜ inch ₩ ℔ 11½c
Sisal.....¼ and 7-10 inch ₩ ℔ 12 c
Sisal, Hay Rope.....₩ ℔ 11 c

Rules. Boxwood. Ivory.
Chapin's, Standard, Stanley, Stephens.....dis 70&10 % } dis 45@55 %

Sad Irons.
From 4 to 10.....₩ ℔ 3½c net
Self-Heating.....₩ doz $9.00 net
Self-Heating, Tailors'.....₩ doz $18.00 net
Gleason's Shield and Toilet.....dis 25 %
Mrs. Pott's Irons, Doubled Pointed.....dis 35 %
Mrs. Pott's Irons, Square Back.....dis 35 %
Enterprise Star Irons, new list, July 20, 1882...dis 35 %
Combined Fluter and Sad Iron....₩ doz $18.00, dis 15 %
Chinese Laundry (N. E. Butt Co.).....85c, dis 15 %
New England.....50 dis 15 %

Sand Paper.
Baeder & Adamson's Flint, 00 to 1½ $4.50 ₩ ream
Baeder & Adamson's Flint, 2, 2½ & 3. 5.00 ₩ ream
Baeder & Adamson's Flint, Assorted. 4.75 ₩ ream
Baeder & Adamson's Star.....3.75 ₩ ream } dis 10&5 %
Baeder & Adamson's Emery..₩ ream $6.50 @ 11.50
Bartles Flint.....$4.75&$5.25 ₩ ream dis 35 %
Bartles Harrison, $4.75 ₩ ream.....dis 35 %
New England, same list as B. & A. Flint.....dis 35 %
Gage's.....dis 40&5 %

Sash Cord.
Common.....₩ ℔ 13c net
Patent.....₩ ℔ 15c net
Silver Lake, Hemp.....₩ ℔ 50c, dis 10&5 %
Silver Lake, White Cotton.....₩ ℔ 50c, dis 10&5 %
Silver Lake, Drab Cotton.....₩ ℔ 55c, dis 10&5 %
Raw Hide, ₩ foot, ¼ in., 5c.; 5-16 in., 7c.; ⅜ in., 10c.
.....dis 15 %
Steel Ribbon.....dis 10 %

Sash Locks.
Clark's, No. 1, $10.00; No. 2, $8.00 per gross.....dis 33⅓ %
Ferguson's.....dis 33⅓ %
Walker's.....net
Hammond's Window Springs.....dis 25 %
Northup Window Springs, No. 1, $10.00 ₩ gross..dis 15 %
"Common Sense," Japanned, Coppered and Bronzed. ₩ gross $5.00 net
"Common Sense," Nickel Plated..₩ gross $10.00 net
"Universal".....dis 30 %

Sash Weights.
Solid Eyes, in 400 ℔ lots and over.....₩ ℔ 1¾cnet

Sausage Stuffers or Fillers.
Miles "Challenge".....₩ doz $30, dis 40 %
Perry.....₩ doz, No. 1½; No. 0, $21, dis 25&5 %
Draw Cut No. 4.....each $30.00, dis. 20 %
Enterprise Mfg. Co.....dis 20&10 %
Silver's.....dis 25 %

Saws.
Disston's Circular, Mill and Cross Cut.....dis 40 %
Disston's Hand, Panel, Rip, &c.....dis 20 %
Boynton's Lightning Cross Cuts, new list.....dis 40 %
Boynton's Circular and Mill.....dis 40 %
Boynton's Ice.....dis 25 %
Boynton's Lightning Hand, Panel and Rip.....dis 25 %
Wheeler & Clemson Mfg. Co.'s Hand.....dis 30 %
W. M. & C. Mfg. Co. Cross Cuts.....dis 30 %
Livingston's Butcher and Kitchen.....dis 20 %
Livingston's Framed Wood—
Nos..... 101 102 103 104 105
Per doz.....$10.00 8.40 10.00 7.50 6.20 net
Peace Circular and Mill.....dis 40 %
Peace Hand, Panel and Rip.....dis 25 %
Peace Cross Cuts.....dis 35 %
Peace Band Saws, all widths.....dis 10 %
Richardson's Circular.....dis 40 %
Richardson's Mill and X Cut.....dis 40 %
Richardson's Hand Panel, Butcher and Web Saws.....dis 25 %

Saw Frames.
White, Vermont.....₩ doz $1.50, dis 25&10%
Red, Polished and Varnished.....₩ doz $1.50, dis 10%
Saw Rods.....$10 list, dis10 & 10%

Saw Sets.
Boynton's Patent X Cut, per doz, $12.00; Hand Saw per doz, $10.00.....dis 25 %
Stillman's Genuine.....₩ doz $3.50 and $4.50 dis 10 %
Stillman's Imitation.....₩ doz $3.25, dis 30&10 %
Common Lever.....₩ doz $2.00, dis 30&10 %
Leach's.....No 0, $8.00; No. 1, $15.00, dis 15 %
Nash's.....dis 20&10 %
Hammer, Hotchkiss.....$5.50, dis 10 %
Hammer, Bemis & Call Co.'s new Patent.....dis 30&5 %
Bemis & Call Co.'s Lever & Spring Hammer..dis 30&5 %
Bemis & Call Co.'s Plate.....dis 10 %
Bemis & Call Co.'s Cross Cut.....dis 12½ %
Aiken's Genuine.....$13.00, dis 5&10 %
Aiken's Imitation.....$7.00, dis 50 %
Hart's Patent Lever.....dis 20 %
Disston's.....dis 20 %
Morrill's.....No. 1, $15 No. 4, $52, dis 40&5 %

Scales.
Hatch, Counter, No. 171.....₩ doz $42, dis 45 %
Hatch, Tea, No 161.....₩ doz $15.00, dis 45 %
Union Platform.....$6.00, dis 45 %
Fairbanks'.....dis 20 %
Riehlé Bros.....dis 20 & 10 %
Buffalo Scale Co.....dis 20&5 %
Forsyth Scale Co.....dis 25 %
Howe's.....dis 20&10 %
Chatillon's Grocers'.....dis 40 %
Chatillon's Eureka.....dis 25 %
Family Universal, 12 ℔, $30; 24 ℔, $36.....net
Family Favorite.....dis 30 %
Family, Turnbull's.....dis 30 %
Scale Beams, List of January 12, 1882.....dis 4 &10 %

Scrapers.
Adjustable Box Scraper (S. R. & L. Co.), $6.50, dis 20&10 %
Box 1 Handle.....₩ doz $4.00, dis 10 %
Box Handle.....₩ doz $6.00, dis 10 %
Defiance Box and Ship.....dis 20&10 %
Foot.....dis 45&10 %
Ship, common.....₩ doz $3.50 net
Ship, Providence Tool Co.....dis 10 %

Screen Corners.
Porter's Pat. Window and Door Frame.....dis 33⅓

Screw Drivers.
Douglas Mfg. Co.....dis 20&10&10 %
Disston's.....dis 40 %
Disston's Patent Excelsior.....dis 40 %
Buck Bros.....dis 25 %
Stanley Rule & Level Co.'s, Varnished Hdls..dis 60&10 %
Stanley Rule & Level Co.'s, Black Handles..dis 50&10 %
Sargent & Co.'s.....dis 50&10 %
Gay's Double Action Ratchet
₩ doz, 4 in., $9.00; 5 in., $10.20; 6 in., $12.00—dis 35 %
Mallett & Co.'s Double Action Clutch
₩ doz, 4 in., $7.40; 5 in., $8.00; 6 in., $9.00—dis 15 %
Champion.....dis 25 %
Clark's Patent.....dis 25 %

Screws.
Flat H'd Iron, new list, Dec. 27, 1882.....dis 55 %
Round Head Iron, new list, Dec. 27, 1882.....dis 50 %
Flat Head Brass, new list, Dec. 27, 1882.....dis 55 %
Round Head Brass, new list, Dec. 27, 1882.....dis 45 %
Brass and Silver Capped.....dis 40 %
Japanned, list of Plain Screws.....dis 30&10 %
Coach, Patent Gimlet Point, 65&10 %, by the keg, dis 70 %
Coach, Common or Lag.....dis 60&5&10 %
Bed.....dis 10 %
Machine, Flat Head, Iron.....dis 55 %
Machine, Round Head, Iron.....dis 50 %
Bench, Iron.....dis 55&10 %
Bench, Wood, Beech.....₩ doz $3.00, dis 10 %
Bench, Wood, Hickory.....dis 20&10 %
Hand, Wood.....dis 20&10 %
Hand Rail, Sargent's.....dis 66⅔&10 %
Hand Rail, Humason, Beckley & Co.'s....dis 66⅔&10 %
Hand Rail, Am. Screw Co., list of Jan. 1, '81.....dis 70 %
Jack (Wilson's).....dis 25 %

Screw Window Balances.
R. B. Hugunin's, No. 1, $2.10; No. 2, $1.75; No. 3 $1.50.....₩ doz net

Scroll Saws.
Lester, $10.00.....dis 25 %
Rogers, $3.50.....dis 25 %

Shears and Scissors.
American (Cast) Iron.....dis 70&10&10 %
Pruning.....see Pruning Hooks and Shears.
Barnard's Lamp Trimmers.....₩ doz $3.75
Tinners'.....add 6 %, dis 10 %
Seymour's, List, Dec., 1881.....dis 60 %
Heinsch's, List, Dec., 1881.....dis 60 %
Heinsch's Tailor's Shears.....dis 33⅓ %
Mass. Cutlery Co. St. Trimmers.....dis 75 %
Wiss, J. & Sons' list, Dec., 1881.....dis 60 %

Sheaves.
Sliding Door, M. W. & Co., list.....dis 4&2 %
Sliding Door, R. & E. list.....dis 60&10&2 %
Sliding Door, Patent Roller.....dis 60&10&2 %
Sliding Door, Patent Roller, Hatfield's....dis 60&10&2 %
Sliding Door, Russell's Anti-Friction.....dis 60&10&2 %
Sliding Door, Moore's Anti-Friction.....dis 60 %
Sliding Shutter, R. & E. list.....dis 50&10&2 %
Sliding Shutter, Sargent's list.....dis 50&10 %
Sliding Shutter, Reading list.....dis 50&10 %
Moore's Anti-Friction (Hanging).....dis 60 %

Shovels and Spades.
Ames, New list, July 1, 1881.....dis 15 %
Griffiths.....dis 50 %
Old Colony.....dis 15 "
Payne Pettebone & Son, new list.....dis 40&10 %
Payne Pettebone & Son, R. R. Shovels.....dis 15 %
Remington's (Bowman's Patent).....dis 30 %
Rowland's.....dis 40&5 %

Shovels and Tongs.
Iron and Brass Head, R. & E. list.....dis 60&10&2 %
Iron and Brass Head, P. S. & W.....dis 60&&10 %
Polished Steel, new list.....dis 50&10&2 %

Slates.
Square Frames, by case.....dis 70 %
Less than a case.....dis 65&10 %

Spoke Shaves.
Defiance Metallic.....dis 20&10 %
Iron.....dis 45 %
Wood.....dis 30 %
Bailey's (Stanley R. & L. Co.), new list....dis 30&10 %
Stearns'.....dis 30&10 %

Spoke Trimmers.
Bonney's.....₩ doz $10.00, dis 40&5 %
Stearns'.....₩ doz $9.00, dis 20&10 %
Ives'.....No. 1, $15.00; No. 2, $12.00 ₩ doz, dis 55&10 %
Douglass'.....₩ doz $9.00, dis 15 %

Spoons.
Basting.....dis 65&10 %
Solid Table and Tea.....dis 65 %
Britannia.....dis 60&10 %
Reed & Barton.....dis 40&10&5 %
Holmes, Booth & Haydens.....dis 40&10&5 %
German Silver.....dis 30&10&5 %
Cast Steel, Silver Plated.....dis 33⅓ %
Tin (P. S. & W.), Teas.....$1.25 ₩ gross, net
Tin (P. S. & W.), Tables.....$3.00 ₩ gross, net
Tin (Cowles Hdw. Co.).....dis 10 %
Tin (Cowles Hdw Co.), case lots.....dis 20 %

Stocks and Dies.
"Lightning" Screw Plate.....dis 5&10 %
.....dis 10 %

Stone.
Hindostan No. 1, 60; Axe, 80.....dis 40 %
Hindostan Hacker Stone.....₩ gross $12.00 dis 10 %
Sand Stone.....₩ ℔ 6c, dis 33⅓&10 %
Washita Stone.....No. 1, ₩ ℔ 18c net
Washita Stone.....No. 2, ₩ ℔ 16c net
Washita Stone, Slips.....No. 1, ₩ ℔ 37c net
Arkansas Stone No. 1, 4 to 6 in.....₩ ℔ $1.35 net
Arkansas Stone No. 1, 6 to 9 in.....₩ ℔ $2.00 net
Turkey Oil Stone (Chase)....4 to 8 in., ₩ ℔, 60c, dis 10 %
Turkey Slips (Chase).....$1.75 ₩ ℔ dis 10 %
Lake Superior (Chase).....₩ ℔ 16c, dis 10 %
Lake Superior, Slips (Chase).....₩ ℔ 30c, dis 10 %
Grindstones, Family, Loring's.....dis 10 %

Stove Polish.
Joseph Dixon's.....₩ gross $6.00, dis 10 %
Gem.....₩ gross $4.50, dis 10 %
Gold Medal.....₩ gross $6.00, dis 25 %
"Mirror".....₩ gross $6.00, dis 5 %
Lustro.....₩ gross $4.75, net
Ruby.....₩ gross $3.75, net
Rising Sun.....₩ gross $5.75, net
Dixon's Plumbago.....₩ ℔ 8c. net
Poynton's Noon Day ₩ gross No. 1, large, $6.50 No. 2, small, $3; No. 3, medium, $4.

Squares.
Steel.....dis 50 %; full cases, dis 60&10 %
Iron.....dis 50 %; full cases, dis 60&10 % } 2 % cash
Nickel Plated.....add $2.50 @ $4.00 ₩ doz, net
Try Square and T Bevels.....dis 50&10 %
Disston's Try Square and T Bevels.....dis 40 %
Winterbottom's Try and Mitre.....dis 20&10 %

Tacks, Brads, &c.
New List, Sept. 1, 1882.
Tinned Swedes Tacks.....dis 30 %
Tinned American Tacks.....dis 30 %
Swedes Tacks, all kinds.....dis 30 %
American Cut Tacks.....dis 30 %
Copper Tacks and Nails.....dis 30 %
Swedes Hungarian Nails.....dis 35 %
Gimp and Lace Tacks.....dis 30 %
Gimp and Lace Tacks, Tinned.....dis 30 %
Finishing Nails.....dis 25 %
Trunk and Clout Nails.....dis 25 %
Common and Patent Brads.....dis 20 %
Basket Nails.....dis 20 %
Brush Tacks.....dis 20 %
Leathered Carpet Tacks.....dis 20 %
Cigar Box Nails.....dis 20 %
Chair Nails.....dis 20 %
Double-pointed Tacks.....dis 40& 5%
Extra 10 % on all.

Tap Borers.
Common and Ring.....dis 20 %
Ives' Tap Borers.....dis 15&10 %
Enterprise Mfg. Co.....dis 20&10 %

Tapes, Measuring.
American.....dis 20 %
Spring.....dis 25&10 %
Chesterman's.....regular list dis 20&25 %

Thermometers.
Tin Case.....dis 75&10 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion).....dis 20&10 %
Wood Bottom.....₩ doz $10.00, dis 25&10 %
All Iron.....₩ doz $8.25, dis 15 %
Nashua Lock Co.'s.....₩ doz $15.00 dis 50&55 %
Wilson's.....dis 35 %
Clipper (Sargent & Co.).....₩ doz $18.00, dis 20 & 10 %

Toe Calks.
Winsted.....₩ ℔ 9c, dis 5

Tinners' Tools and Machines.
Machines (P. S. & W.).....list add 20 % } dis 10 %
Tools (P. S. & W.).....add 6 % }

Transom Lifters.
Wollensak's Patent.....dis 35 %
Reiher's Patent, new list, Feb., 1882.....dis 20&10&10 %
Excelsior.....dis 50&10&2 %

Traps.
Game, Newhouse.....dis 35 %
Game, Oneida Pattern.....dis 60 %
Game, Blake's Patent.....dis 40&5 %
Mouse, Wood, Choker.....₩ doz hds. 14c
Mouse, Round Wire.....₩ doz $1.50, dis 10 %
Mouse Cage, Wire.....₩ doz $2.50, dis 10 %
Mouse, Catch-em-alive.....₩ doz $2.50, dis 15 %
Mouse, "Bonanza".....per gross $10.00 net
Rat, "Decoy".....₩ doz $10.00, dis 10 %

Trowels.
Lothrops' Brick and Plastering.....dis 25 %
Reed's Brick and Plastering.....dis 15 %
Disston's Brick and Plastering.....dis 20 %
Peace's Plastering.....dis 25 %
Clement & Maynard's.....dis 20 %
Rose's Brick.....dis 15 %
Brades' Brick.....dis 25 %
Worrall's Brick and Plastering.....dis 20 %
Garden.....dis 55 %

Triers.
Butter and Cheese.....dis 25 %

Trucks (Warehouse, &c.
Penfield Block Co.'s list, 1882.....dis 40 %

Vises.
Solid Box.....dis 35 %
Solid "Crown" (A. H. Hildick).....40 to 100 ℔, 15c net
Solid, Peter Wright's.....15½c
Solid, Wilkinson's.....16c@17c
Parallel, Parker's.....dis 60 %
Parallel, Wilson's.....dis 35&10 %
Parallel, Howard's.....dis 20&10 %
Parallel, Merrill's.....dis 15 %
Parallel, Sargent's.....dis 60&10 %
Parallel, Backus and Union.....dis 40 %
Parallel, Oval Slide.....dis 40 %
Parallel, Double Screw Leg.....dis 15&10 %
Parallel, Prentiss.....dis 25 %
Parallel, Simpson's Adjustable.....dis 25&5 %
"Family," List.....net
Saw Filers, Bonney's.....₩ doz $14.00, dis 20&10 %
Saw Filers, Stearn's.....dis 20&10 %
Saw Filers, Hopkins'.....₩ doz $17.50, dis 10 %
Saw Filers, Reading.....dis 40&10 %
Cowell Hand Vises.....dis 20 %
Richardson's Vise and Anvil.....dis 25 %

Washer Cutters.
Smith's Patent.....₩ doz $12.00, dis 25 %
Johnson's.....₩ doz $11.00, dis 33⅓ %
Penny's.....₩ doz Pol. $17.50; Jap'd, $16.50, dis
Appleton's.....₩ doz $16.00, dis 60&10 %

Washers.—See Nuts and Washers.

Well Wheels......dis 60&10 %

Wire.
Brass and Copper.....dis 30 %
Market, Bright and Annealed.....dis 55 @ 57½ %
Market, Coppered.....dis 50 @ 52½ %
Market, Galvanized.....dis 45 @ 47½ %
Market, Tinned, Tinned list.....dis 47½ @ 50 %
Stone, Bright and Annealed Nos. 0 to 18.dis 57½ @ 60 %
Stone, Bright and Annealed Nos. 19 to 26 dis 60 @ 62½ %
Stone, Bright and Annealed Nos. 27 to 36.dis 62½ @ 65 %
Stone, Galvanized Nos. 19 to 30.....dis 45 @ 47½ %
Stone, Tinned, Tinned list.....dis 45 @ 47½ %
Tinned Broom Wire.....dis 57½ @ 60 %
Cast Steel Wire.....dis 47½ @ 50 %
Annealed Fence, Nos. 8 & 9.....dis 57½ @ 60 %
Annealed Grape, Nos. 10 to 14.....dis 57½ @ 60 %
Fence Staples.....₩ ℔ 5¾ @ 5¾c
Fence Staples, Galvanized.....₩ ℔ 6¾ @ 6¾c
Stube Steel Wire.....$6.00 to & dis 20 %
Japanned Barb Fence.....₩ ℔ 6½c
Galvanized Barb Fence.....₩ ℔ 7¼c
Steel Music Wire, Nos. 7 to 30.....$1.00 ₩ ℔
Picture Wire, T. S. & J.....dis 40 %
Clothes Line Wire, Galvanized.....₩ coil 25 @ 40c net
Wire Cloth, green, drab and black, ₩ sq. ft., 20. @ 24c.....net

Wrenches.
American Adjustable.....dis 45 %
Baxter's Adjustable "S," list Jan., 1880.....dis 20&5 %
Baxter's Diagonal.....dis 20&5 %
Coes' Genuine.....dis 50&3 %
Coes "Mechanics".....dis 50&10&3 %
Coes' Pattern, Malleable.....dis 75 %
Coes' Pattern Wrought.....dis 65@70 %
Girard Standard.....dis 60 %
Girard Agt.....dis 70 %
Bemis & Call's Patent Combination.....dis 20 %
Bemis & Call's Merrick Pattern.....dis 35 %
Bemis & Call's Brigg's Pattern.....dis 25 %
Bemis & Call's Cylinder or Gas Pipe.....dis 40 %
Van Wagoner & Williams' Basin.....₩ doz $4.50
Aiken Pocket (Bright).....$5.00, dis 50&10 %
The Favorite Pocket (Bright).....₩ doz $4, dis 40 %
Webster's Patent Combination.....dis 25 %
Taylor's Farmers'.....dis 25 %

Wringers. Per doz.
Universal, XX, No. 2½.....$2.00
Universal, XX, No. 2.....$1.00
Universal, XX, No. 1½.....$1.00
Universal, XX, No. 1.....$6.00
Peerless, no Cogs, No. 1.....$2.00
Peerless, with Cogs, No. 2½.....$5.00
Peerless, with Cogs, No. 2.....$5.00
Peerless, with Cogs, No. 3.....$4.00
Peerless, with Cogs, No. 4.....$6.00
Eureka, No. 2.....$2.00
Novelty No. 2, for Common Tubs.....$12.00
Novelty No. 3, for Common Tubs.....$10.00
Excelsior No. E, for Stationary Tubs.....$11.00
Excelsior No. F, for Stationary Tubs.....$17.00
Excelsior No. A, with Folding Bench.....$20.00
Excelsior No. B with Folding Bench.....$16.00
Lots of 1 doz., dis 33⅓ %; lots of 5 doz., dis 40 %.

NEW YORK WHOLESALE PRICES, July 19, 1883.

(For Wholesale Hardware Prices See Page 30)

METALS.

IRON.—DUTY: Bars, 8-10 c to 1 2-10 c ₩ lb; provided that no Bar Iron shall pay a less rate of duty than 35 per cent. Sheet, 1 1-10 c ₩ lb to 30 % ad val. Boiler, 1¼ c ₩ lb. Band, Hoop and Scroll, 1 c to 1 4-10 c ₩ lb. Pig, 3-10 of 1 c ₩ lb. Wrought and Cast Scrap, 3-10 of 1 c ₩ lb. Railroad Bars, weighing more than 25 lb ₩ yard, 7-10 of 1 c ₩ lb. Steel Railroad Bars, weighing more than 25 lb ₩ yard, $17 ₩ ton.

American Iron		
Foundry, No. 1	₩ ton	$22.00 @ 23.00
Foundry, No. 2	₩ ton	19.00 @ 20.00
Gray Forge	₩ ton	18.00 @ 19.00
Scotch Iron.		
Eglinton	₩ ton	21.00 @ 21 50
Carnbroe	₩ ton	22. 50 @ 23.00
Coltness	₩ ton	24.00
Shotts	₩ ton	24.00
Glengarnock	₩ ton	23.00
Gartsherrie	₩ ton	24.00
Langloan	₩ ton	24.00
Summerlee	₩ ton	23.00 @ 23.50
Malls.		
Steel, at Eastern mills	₩ ton	38.00
Old Rails Ts		21.00 @ 22.00
Scrap.		
Wrought, ₩ ton from ship and yard		21.50 @24.50
Bar Iron from Store.		
Common Iron ¾ to 1 in. round and square; 1 to 6 in. x ¾ to 1 in.	₩ lb	2.1c @ 2.20c
Refined Iron: ¾ to 2 in. round and square; 1 to 6 in. x ¾ to 1 in.	₩ lb	$2.30 @ 2.40c
1 to 6 in. x ¼ and 6-10	₩ lb	2.50 @ 2.60c
Rods—⅝ and 11-16 round and square	₩ lb	2.40 @ 2.50c
Bands—1 to 6 x 3-16 to No. 12	₩ lb	2.70 @ 2.80c
Norway Nail Rods	₩	@ 5¼c

Sheet Iron.

	Common American	R. G. American.
Nos 10 to 16	₩ lb 3.1c @ 3.30c	4¼c
17 to 20	₩ lb 3.40 @ 3.60c	4¼c
21 to 24	₩ lb 3.65 @ 3.90c	4¾c
25 to 26	₩ lb 3.90 @ 4.15c	5 c
27	₩ lb 4.15 @ 4.35c	5 c
28	₩ lb 4.40 @ 4.65c	5¼c
	B. B.	20 qual.
Galvanized, 10 to 20	₩ lb 7 c	6 c
Galvanized, 21 to 24	₩ lb 7¼c	6¼c
Galvanized, 25 to 26	₩ lb 8¼c	7 c
Galvanized, 27	₩ lb 9 c	7½c
Galvanized, 28	₩ lb 9½c	8 c
Patent Planished	'A' ₩ lb 10½c	B. 9½c
Russia	₩ lb 13	@ 14c
American Cold Rolled	₩ lb	c @ 7½c

COPPER.—DUTY: Pig, Bar and Ingot, 4c; Old Copper 5c ₩ lb. Manufactured (including all articles of which Copper is a component or chief value), 35 % ad valorem.

American Ingot ₩ lb See Trade Report.

SHEATHING BRAZIERS COPPER, BOLTS, &c.

Brazier's Copper, ordinary sizes, 16 oz. per sq. ft., and over ₩ lb 26c

Braziers' Copper, ordinary sizes, under 16 oz. and over 12 oz., ₩ sq. ft. ₩ lb 28c

Braziers' Copper, 10 oz. and 12 oz., ₩ sq. ft. ₩ lb 30c

Brazilers' Copper, Lighter than 10 oz. ₩ sq. ft. ₩ lb 32c

Circles less than 8 in. in diameter ₩ lb 28c

Circles 8 in. diameter and over ₩ lb 31c

Segment and Pattern Sheets ₩ lb 28c

Locomotive Fire Box Sheets ₩ lb 26c

Sheathing Copper, over 12 oz. ₩ sq. ft. ₩ lb 24c

Bolt Copper ₩ lb 26c

Copper Bottoms ₩ lb 31 @ 26c

No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the sq. ft.

TINNING.

Sheets 14 x 48 ₩ sheet 8c

All other size Sheets, 2½c ₩ sq. ft.

For tinning both sides, double the above amount.

O'NEILL'S PATENT PLANISHED COPPER.—Net.

14x48.

14 and 16 oz. and heavier ₩ lb 37c By the case. ₩ lb 36c

12 oz. and lighter ₩ lb 40c " ₩ lb 39c

Boiler Sizes.

7 in., 14x42. 8 in., 14x45. 9 in. 14x60.

14 and 16 oz. and heavier ₩ lb 39c By the case. ₩ lb 38c

(And all sizes not over 20 in. wide.)

24x48 & 30x60.

14 and 16 oz. and heavier ₩ lb 41c

oz ₩ lb 44c

SHEATHING METAL.

Yellow Sheathing metal ₩ lb 20 @ 22c

BRASS.

Brown & Sharpe's Gauge the Standard for Metals. Old English Gauge the Standard for Wire.

BRASS MANUFACTURERS' PRICE LIST.—dis. 30 %. June 10, 1880.

Cash prices for Roll and Sheet Brass. For less quantities than 100 lbs add 3c. ₩ lb.

HIGH BRASS.

All Nos. not thinner than No. 28, wider than 2 in., not wider than 14 in. 30c

All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive 33c

All Nos. to No. 38, inclusive, and widths over 20 to 30 in., inclusive 38c

4c. ₩ lb advance on each No. above Nos. 28 to 38, inclusive.

All Brass thinner than No. 38 is Platers' Brass, at 43c

Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in. 37c

Printers' Rules 45c

Sheets wider than 30 in. and under 40 in. 47c

" 40 in. and over 50c

Circular Sheets, in diam. from 4 in. to 14, inclusive 40c

" over 14 " 20, " 45c

" " 20 " 30, " 49c

" " 30 " 40, " 55c

" 40 in. 59c

LOW BRASS.

Four cents ₩ lb more than High Brass.

Gilding Metal, 8c ₩ lb more than High Brass.

Platers' or Gold Metal: In Bars 48c; Sawed 51c; Planed or Polished 54c

FOR SLITTING.

Metal, in width 1 in. to ⅛ in. to No. 28, inclusive, 1c ₩ lb advance.

Metal, in width 2 in. to 1 in thinner than No. 28, 2c ₩ lb advance.

Metal, in width 1 in. to ¼ in thinner than No. 28, 3c ₩ lb advance.

Metal in width ¼ in. to ½, inclusive, not thinner than No. 28, 2c ₩ lb advance.

Metal in width ½ in. to ¼ thinner than No. 28, 5c ₩ lb advance.

Metal, ¼ in. in width and less, 10c ₩ lb advance.

Any of the above widths cut to particular lengths, add 7c ₩ lb.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire
4 per cent., 12 inch to No. 26	$0.52	$0.70
6 " " "	.56	.76
8 " " "	.64	.88
5 " " "	.74	1.03
8 " " "	.85	1.12

German Silver Sheets over 12 in. wide and weighing more than 10 lb., $2 ₩ lb.

Advance 3c. for each additional inch in width above 12 in. and 2c. ₩ lb on each No. thinner than Nos. 26 to 2, inclusive.

All German Silver thinner that No. 36 is Platers', at 60c. ₩ lb additional.

German Silver Scrap, one-half less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Copper.
No. 0 to 20	$0.33	$0.37	$0.48
No. 21	.36	.40	.46
No. 22	.37	.41	.47
No. 23	.38	.42	.48
No. 24	.40	.44	.50
No. 25	.43	.47	.53
No. 26	.45	.49	.55
No. 27	.48	.52	.58
No. 28	.52	.56	.63
No. 29	.55	.59	.66
No. 30	.58	.62	.72
No. 31	.62	.66	.78
No. 32	.66	.70	.84
No. 33	.70	.74	.93
No. 34	.74	.78	1.03

Spring Wire 2c ₩ lb advance

Flat, Square and Half-Round Wire 5c ₩ lb advance on Round Wire.

Fancy Wire not less than 100 ₩ lb advance on Round Wire.

Brass Rods, No. 8 and larger, not less than 2 feet lengths. 38c.

Wire straightened and cut smaller than No. 8 and not less than 2 feet lengths, 43c.

Wire and Rods less than 2 feet lengths, special rates.

Twelve cents per lb extra for spooling on 1 lb spools No 36.

MISCELLANEOUS.

Brass Pail Ears	$0.60
Brass Door Rail	.43

SCRAP.—Net.

High Brass Scrap	12c
Low Brass Scrap	14c
Gilding	16c

Turnings, Filings and Chips half the price of Scrap.

Terms—Net cash. Interest to be added after thirty days.

TUBING.—dis. 30 %.

	₩ lb
Plain to No 20 inclusive above ¼ in. to 3 in.	$0.42
Plain above 3 in.	.43

Nos. 21, 22, 23, two cents advance on List for each Number.

Nos. 24, 25, 26, four cents advance on List for each Number.

Above No. 26, special rates.

Plain, ¼ inch 78

Plain, 3-16 inch 1.10

Plain, ⅛ inch 1.05

All Mandrel Drawn Tubes, 5 cents advance on List Prices.

Fancy Tubing to No. 20 50

English, Scotch and Extra Patterns Fancy Tubing to No. 20 55

Tubing Sawed or Cut 2 to 4 feet long, 2 cents advance on List

Add two cents, ¼ cent for each additional cutting under 2 feet

All Mandrel Drawn Tubes under 25 in. ¾c ₩ lb advance.

ZINC TUBING—dis. 25 %.

Plain	27
Fancy	33
Scotch and Extra Patterns	36

GERMAN SILVER TUBING.—dis 25 %.

4 Per cent.	.80
6 Per cent.	.90
9 Per cent.	1.00
12 Per cent.	1.20
15 Per cent.	1.35
16 Per cent.	1.45
18 Per cent.	1.50
20 Per cent.	1.60

STEEL.—DUTY: Ingots, Bars, Sheets, &c., valued at 4c ₩ lb or less, at 45 % ad val. Valued above 4c and not above 7c ₩ lb pays 20 ₩ lb duty; valued above 7c and not above 10c ₩ lb pays 2½c ₩ lb duty; valued above 10c ₩ lb pays 3½c ₩ lb duty. *Extras.* "Steel bars, rods, &c., cold hammered or polished, in any way in addition to ordinary hot rolling, shall pay ½c ₩ lb in addition to above." Steel Circular Saw Plates shall pay 1c ₩ lb in addition to the above.

American Cast Steel.

For American Steel see quotations under heading of Pittsburgh.

English Steel.

Best Cast	₩ lb 15½c
Extra Cast	₩ lb 16½c
Circular Saw Plates	₩ lb 10c
Round Machinery, Cast	₩ lb 10c
Swaged, Cast	₩ lb 18c
Best Double Shear	₩ lb 14½
Blister, 1st quality	₩ lb 13c
German Steel, Best	₩ lb 11c
2d quality	₩ lb 10c
3d quality	₩ lb 9c
Sheet Cast Steel, 1st quality	₩ lb 15½c
2d quality	₩ lb 14½c
3d quality	₩ lb 12½c

ANTIMONY See Trade Report

LEAD.—DUTY: Pig, $2 ₩ 100 lb Old Lead, 2c ₩ lb Pipe and Sheet, 3c ₩ lb.

American	4.65 @ 4.70c
Bar	6c
Pipe	6½c. dis 10 %
Tin Lined Pipe	15c. dis 10 %
Sheet	7½c. dis 10 %
Shot	Drop 7c, Buck. 8c
Chilled Shot	8c

BABBITT METAL.

N. P. U	₩ lb 8c

A. 28c; B. 20c; C. 15.

TIN.—DUTY: Plates, Sheets, Tagger and Terne, 1c ₩ lb; Bars, Block and Pigs free.

Banca	₩ lb 23½c
Straits	₩ lb 23½c
English	₩ lb 25 c

TIN PLATES.

I C 10x14 } I C 14x20 } Prime Charcoal	$6.25 @ 6.75
Second quality	$5.87½ @ 6.25
I C 12x12 Prime Charcoal	6.50
I X 10x14 } I X 14x20 } Prime Charcoal	7.75 @ 8.00
Second quality	$7.25 @ 7.50
I X 12x12, Prime Charcoal	8.25
D C 12½x17, Prime Charcoal	5.75
D X 12½x17, Prime Charcoal	7.25
For each additional X add	1.50

COKE TIN PLATE.

	Best.	Ordinary.
I C 10x14 } I C 14x20 }	$5.00	$4.15 @ 5.40
I C 12x12	5.75	5.40 @ 5.50

TERNE PLATE.

	Prime Char.	2d Qual.	Coke.
I C 14x20	$5.50 @ 5.62½	5.25	5.12½
I X 14x20	7.00	....	....
I C 20x28	10.75 @ 11.25	10.50	10.00 @ 10.25
I X 20x28	15.00	....	....
I C 20x200	14.00	....	....
I C 14x20 M. F. Brand			$7.75

SOLDER—½ & ½ 15c

Extra 13½c

No. 1 12 c

SPELTER.—DUTY: In Pigs, Bars and Plates, $1.50 ₩ 100 lb.

American, cash	5.00 @ 5.25

ZINC.—DUTY: Pig or Block, $1.50 ₩ 100 lb: Sheet 2½c ₩ lb.

Sheet, Cask	6¼ @ 6½c
Sheet, Open	6¼ @ 7c

Paper Stock, &c.

(Dealers' Selling Prices.)

	Cents ₩ lb
White Shirt Cuttings, No. 1	6¼ @ 7
White Shirt Cuttings, No. 2	5 @ 5½
Mill Assorted Whites	5¼ @ 5½
Unbleached Muslins	6¼ @ 6¾
City Whites, No. 1	4¼ @ 4½
New Canton Flannels	@ 6¼
New Seconds, light	3¼ @ 3¼
New Seconds, dark	2¾ @ 3
No. 2 Whites	@ 2½
Cotton Canvas	4½ @ 4¾
Linen Canvas, No. 1	4¼ @ 4½
Seconds, City No. 1	1¾ @ 1¾
Seconds, City No. 2	1¼ @ 1¾
Colors, per cwt.	70 @ 0c
Manila Rope	@ 3½
Manila Rope, Tarred	2½ @ 2¾
Gunny Bagging, No. 1	1¾ @ 2
Gunny Bagging, No. 2	1¾ @ 1½
Kentucky Bagging	4½ @ 4¾
Burlap Bagging, No. 1	2¾ @ 2½
Tar Shakings	2 @ 2¾
Hemp Twine Stock	4½ @ 4¾
Hard White Shavings, No. 1	4 @ 4¼
Soft White Shavings, No. 1	3¼ @ 3½
White Shavings, No. 2, soft	3 @ 3
Mixed Shavings, part white	2½ @ 3
Ledger and Writing	3 @ 3¼
Solid Stock	2½ @ 2¾
Book Stock, No. 1, light	1¼ @ 1½
Old Newspapers	1¼ @ 1¾
Pure Manilas	1¾ @ 2
Bogus Manilas and Hardwares	¾ @ 1
Commons per 100 lbs	60 @ 70
Binders' Board Cuttings	¾ @ 1
Straw Board Cuttings per cwt.	75 @ 80

Paints, Oils, &c.

Paints.

Black Lamp, Coach Painters	₩ lb 22 @ 24c
Black Lamp, Ordinary	₩ lb 5c
Black Ivory Drop, fair	13 @ 15c
Black Ivory Drop, best	23c
Black Paint, in oil	kegs 8c; asst'd cans, 11c
Blue Prussian, fair to best	40 @ 55c
Blue Prussian, fair to best, in oil	45 @ 55c
Blue Chinese dry	70c
Blue Ultramarine	18 @ 30c
Brown, Spanish	1½c
Brown, Van Dyke	10 @ 12c
Green, Chrome	15 @ 23c
Green, Chrome, in oil	14 @ 18 @ 24c
Green, Paris	good, 20c; best, 25c
Green, Paris, in oil	good, 30c; best, 45c
Iron Paint, Bright Red	₩ lb 2½c
Iron Paint, Brown	₩ lb 1½c
Iron Paint, Purple	₩ lb 3 c
Iron Paint, Ground in oil, Bright Red	₩ lb 6½c
Iron Paint, Ground in oil, Red	₩ lb 5½c
Iron Paint, Ground in oil, Brown	₩ lb 5½c
Iron Paint, Ground in oil, Purple	₩ lb 6 c
Mineral Paints	2 @ 4c
Orange Mineral	10c
Red Lead, American	7c
Red Venetian (Eng.) dry	$1.65 @ $1.75
Red Venetian, in oil	asst'd cans, 11c; kegs, 8c
Red Indian dry	9 @ 12c
Rose Pink	10 @ 13c
Sienna, American, Raw, powdered	4c
Sienna, Burnt, powdered	4½c
Sienna, Burnt, in oil	10 @ 16 @ 20c
Sienna, Raw	11 @ 15 @ 25c
Umber, Burnt, powdered	4 @ 8c
Umber, Burnt, in oil	9 @ 12 @ 15c
Umber, Raw, powdered	3½ @ 7½c
Umber, Raw, in oil	10 @ 15 @ 25c
Vermilion, Chinese	90c
Vermilion, English	46 @ 48c
Vermilion, American, Common	15c
White Lead, American, pure dry	6½ @ 6¾c
White Lead, American, pure in oil	6½ @ 7c
White, Paris, English, prime	in bbls. 2 @ 2½c
Yellow Ochre, French	$1.75
Yellow Ochre, French, in oil	asst'd cans, 11c; kegs, 8c
Yellow Ochre, Vermont	in casks, 1½c
Yellow Chrome	17 @ 27c
Yellow Chrome, in oil	14 @ 18 @ 25c
Zinc White, American No. 1, dry	5 @ 6c
Zinc White, American No. 1, in oil	9c
Zinc White, French (Paris) dry	8 @ 10c
Zinc White, French, in oil	10 @ 11c

Oils.

Linseed Raw, in casks and bbls	56c
Linseed Boiled, in casks and bbls	59c
Linseed, Calcutta	57c
Bleached Whale	₩ gal. 93c
Bleached Sperm	₩ gal. $1.22
Bleached Elephant	72c
Signal	80c
Prime Lard	75c
No. 1 Extra	70c
West Virginia	8c @ 15c
Drilling	40c
Miners' Oil	44c @ 47c
Fish Oil, pressed	43c @ 45c
Neatsfoot	75 @ 85c
Tallow	70c @ 75c
Empire Cylinder Oil	65c
Machinery	40c
Engine	50c

Sundries.

Asphaltum Cuban	4c @ 8c
Asphaltum Egyptian	3½c @ 6c
Benzine	₩ gal. 9c @ 11c
Chalk	80c
Chalk, Block	90

Dryers Patent Am'n	asst cans, 9c; keg 7c
Frostings	4c
Glue, White	24 @ 35c
Glue, Sheet	20c
Glaziers' Points, Zinc	8c
Gum, Copal	36c
Gum, Damar	24c
Gum Shellac, English	40c
Gum Shellac, English, dark	35c
Litharge	7½c
Mineral Wool, ordinary	₩ lb 1 @ 1½c
Mineral Wool, extra	₩ lb 3 @ 3½c
Pumice Stone, selected Lumps	4 @ 6c
Pumice Stone, Powdered	2½c
Pine Tar, bbls	$2.75
Pitch	$2.00
Putty, in bladders	3c
Putty, in bulk	2½c
Rosin—Common and Good—Strained	$1.90
E & F	$2.10 @ $2.20
G & H	$2.30 @ $2.50
I & K	$2.60 @ $2.80
M & N	$3.00 @ $3.25
Spirits Turpentine	37 @ 38c
Whiting Spanish	3c
Waste, No. 1 Cop	10c
Waste, No. 1 White Machine	10c
Waste, No. 2 White Machine	9½c
Waste, No. 1 Colored	7c
Waste, No. 2 Colored	6½c
Waste Washed Machine	6c

Glass.

Prices current per box of 50 feet.
List, July 2, 1883.

Single.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$13.50	$11.50	$10.75	$10.25
11 x 14 to 16 x 24	14.50	13.50	12.50	11.50
18 x 22 to 20 x 30	18.50	17.00	15.50	14.00
15 x 36 to 24 x 30	20.50	18.50	16 25	
26 x 28 to 24 x 36	22.00	20.50	17 50	
26 x 36 to 26 x 44	23.00	22.00	18.50	
36 x 46 to 30 x 50	26 00	24.00	20.50	
30 x 52 to 30 x 54	27.00	25.00	21.50	
30 x 56 to 34 x 60	29.00	27.00	24.00	
34 x 58 to 34 x 60	31.00	29.00	26.00	
36 x 60 to 40 x 60	35.00	31.00	29.00	

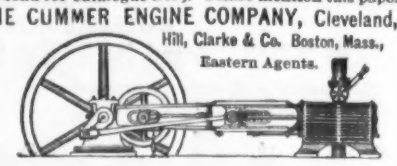
Double.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$17.50	$15.00	$14.00	$13.00
11 x 14 to 16 x 24	20.00	18.00	16 50	
18 x 22 to 20 x 30	24.00	22 00	20.00	
15 x 36 to 24 x 30	26.50	24.00	21.50	
26 x 28 to 24 x 36	29.00	26.00	23.00	
26 x 36 to 26 x 44	30 00	28.00	24.00	
26 x 46 to 30 x 50	32.00	31.00	27.00	
30 x 52 to 30 x 54	35 00	32.00	28.00	
30 x 56 to 34 x 60	37.00	34.00	30.00	
34 x 58 to 34 x 60	40.00	37.00	32.00	
36 x 60 to 40 x 60	43.00	40.00	37.00	

Sizes above—$15 per box extra for every 5 inch s. An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches, will be charged in the united 84 inches bracket. Discount, 70 and 10.

THE IMPROVED CUMMER AUTOMATIC ENGINE.

WE BUILD FIVE CLASSES OF ENGINES.
No Steam-Engine Establishment in the U. S. is as well equipped as ours for doing first-class work.
Send for Catalogue No. 9. Please mention this paper.
THE CUMMER ENGINE COMPANY, Cleveland, O.
Hill, Clarke & Co. Boston, Mass., Eastern Agents.



CAUTION.

THE

"Peter Wright" Patent Anvil.

It having come to our knowledge that Anvils of inferior make, and marked in a manner calculated to mislead buyers, are being sold as the "PETER WRIGHT" ANVIL, we beg to inform all buyers that all our Anvils are stamped on the side

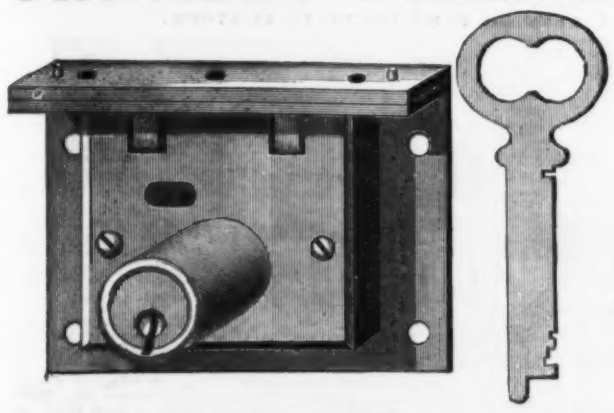
PETER
WRIGHT
PATENT
SOLID WROUGHT

and none are genuine unless they bear these marks. We also gum a green label on the other side of Anvil.

PETER WRIGHT & SONS.

THE

CHARLES PARKER CO.,



MERIDEN, CONN.,

Manufacturers of

CABINET LOCKS.

ILLINOIS IRON & BOLT CO.,

Nos. 20 to 26 Main St., CARPENTERSVILLE, KANE. CO., ILL.,

MANUFACTURERS OF

WARREN'S

PATENT TUYERE IRON.

THIMBLE SKEINS, BLACKSMITHS' TOOLS, JACK SCREWS, SAD IRONS, COPYING PRESSES and STANDS, &c.

CHICAGO FORGING CO.,

No. 14 Metropolitan Block,

CHICAGO, ILL.

DROP FORGINGS

IRON AND STEEL OF EVERY DESCRIPTION

For Fire Arms, Saw and Wind Mills, Engine, Tool and Machine parts of all kinds. Railroad and Marine Work. Agricultural Implements and Machinery, Carriage and Wagon Irons, Electrical and other Apparatus.

ANSON STAGER, President,
W. H. SWIFT, Vice-President,
E. L. BROWN, Treas. & Gen. Man.
F. J. CUSHING, Secretary.

Orders for Forgings in Iron or Steel required to be duplicated in large numbers, or which may be too small, intricate or expensive to be made by hand on the anvil, are especially solicited. Estimates furnished upon receipt of sample or patterns of forgings required.

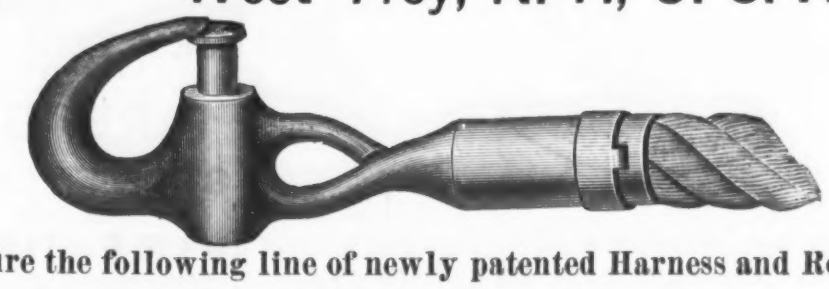
Elevator scales—all varieties. Erie Elevator, Dow's, Storr's and others. Send for estimates.

RIEHLÉ BROS.
STANDARD
SCALES
AND
TESTING MACHINES

PHILADELPHIA, 4th St., ab. Chestnut.
NEW YORK, 115 Liberty Street.
ST. LOUIS, 609 North Third St.
NEW ORLEANS, 142 Gravier Street.

THE UNION HARDWARE MFG. CO.,

West Troy, N. Y., U. S. A.,



Manufacture the following line of newly patented Harness and Rope Goods:

Loop, Round Eye, Open Eye, Double and Swivel "Union Snaps;" Cattle and Horse Ties, in Hemp and Jute, with Rope Clamp, obviating Double Splice (see cut); Rope Buckle and Rope End Clamp; Leather Horse Ties; Hitching, Breast, Rein and Halter Chains, &c., &c.

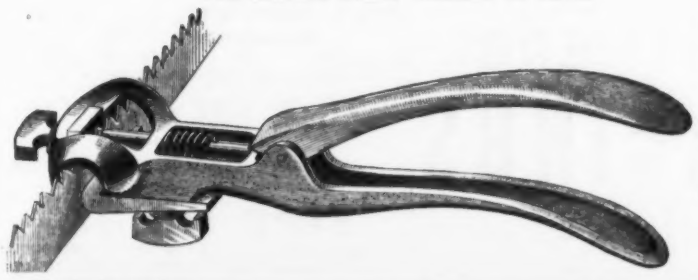
ILLUSTRATED CATALOGUE SENT FREE ON APPLICATION.

HORACE F. SISE, Agent,

100 Chambers Street, NEW YORK.

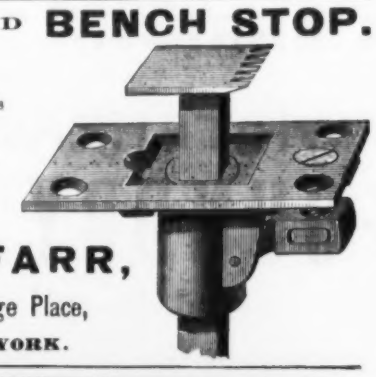
MORRILL'S PERFECT SAW SETS AND BENCH STOP.

FOR SETTING EVERY VARIETY OF SAWS.



For price lists and discounts Address

ASA FARR,
64 College Place,
NEW YORK.

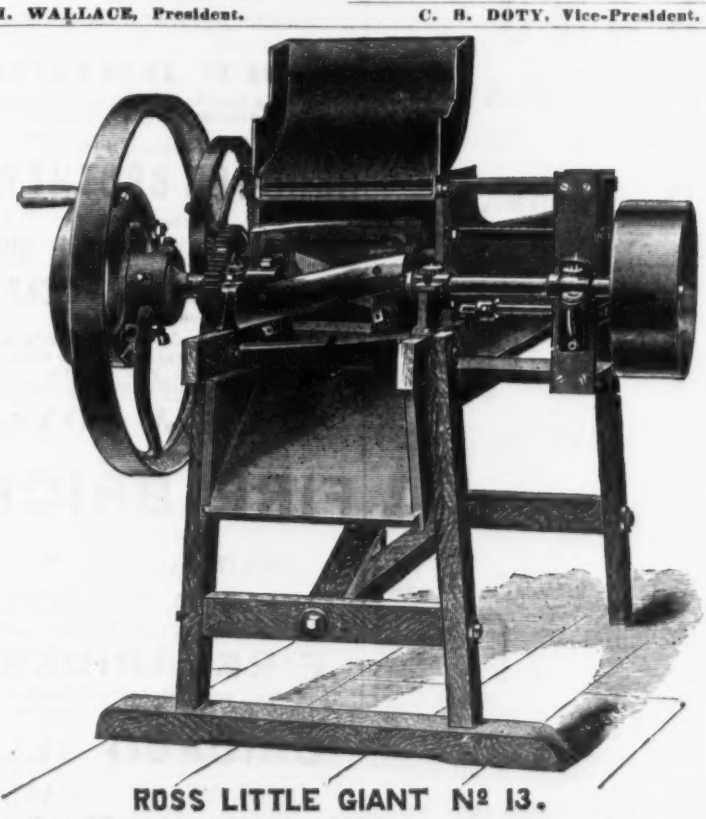


JEFFERSON NAILS

ALSO

JEFFERSON PIG IRON.

Forge and Foundry, JEFFERSON IRON WORKS.
Office and Works, - - - - - - - - - STEUBENVILLE, OHIO.
W. H. WALLACE, President. C. B. DOTY, Vice-President. GEO. P. HARDEN, Secretary.



ROSS LITTLE GIANT No 13.

ROSS ENSILAGE AND FODDER CUTTERS, Giants and Little Giants.
THE VERY BEST CUTTERS IN THE MARKET.
GUARANTEED TO GIVE PERFECT SATISFACTION.
Our 1883 Cutters are the finest we have ever produced. A liberal discount to the trade. Write for prices and illustrated circular.
E. W. ROSS & CO., Fulton, Oswego Co., N. Y.
Mention *The Iron Age*.

S. CHENEY & SON,
MANLIUS, N. Y.
MANUFACTURERS OF LIGHT AND MEDIUM WEIGHT
GRAY IRON CASTINGS,
METAL PATTERN MAKERS AND JAPANNERS.
Correspondence solicited.

THE HARTFORD HAMMER CO., Hartford, Conn.

Manufacturers of Solid Cast Steel Hammers, fully WARRANTED.

All Hammers stamped "HARTFORD" are See first issue of each month.

RIVETS, BOILER, TANK AND BRIDGE.
STANDARD RIVET CO., Cleveland, Ohio.

VULCAN BOILER WORKS.

JAMES McNEIL & BRO.,
MANUFACTURERS OF
BOILERS, SHEET IRON, ROLLING MILL AND BLAST FURNACE WORK
Of all Kinds.
Vertical Boilers and Engines a Specialty. Repairing Done Promptly.
29th Street and A. V. R. R.,
PITTSBURGH.
Specifications for Boilers furnished free of charge

HOWARD IRON WORKS,
BUFFALO, N. Y.,
Manufacturers of

BENCH VISES,

Price Lists sent on application

Dynamite, Nitro Glycerine,
BLASTING MATERIALS.
Contracts Taken for Clearing Lands of Stumps.
ADDRESS
THE HERCULES POWDER COMPANY
Cincinnati, Ohio.

GEO. M. EDDY & CO.,
Manufacturers of
Measuring Tapes
Of Cotton, Linen & Steel
ALL PURPOSES.
361 to 363 Classon Ave. Brooklyn N. Y.

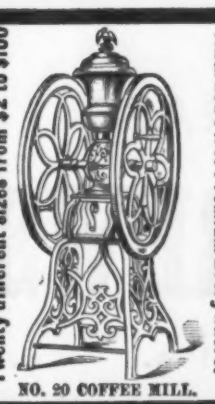
The Iron Age Directory

And Index to Advertisements.


Fruit, Wine & Jelly Press.


SAUSAGE STUFFER.

Self-Measuring Faucet.



NO. 20 COFFEE MILL.

ENTERPRISE MANUFACTURING CO. OF PA.,
THIRD & DAUPHIN STS, PHILADELPHIA, PA.

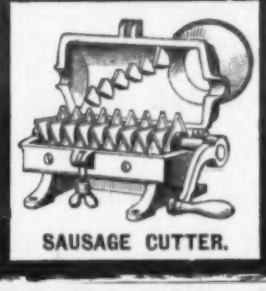

MRS. POTTS'
Cold Handle Double Pointed Sad Irons.

Tincture Presses,
Self-Weighing
Cheese Knife,
Cork Presses.

THE BEST
ARE THE
CHEAPEST.

SOLD BY HARDWARE DEALERS.
SEND FOR ILLUSTRATED CATALOGUE, FREE.


Smoked Beef Shaver.


SAUSAGE CUTTER.


Bung Hole Borer.

Tobacco & Root Cutter.

THE STANLEY WORKS,

MANUFACTURERS OF

Wrought Iron Butts, Hinges

AND

DOOR BOLTS,

Plain, Japanned, Bronzed and Plated.

FACTORIES: New Britain, Connecticut.

WAREHOUSE: 79 Chambers St., New York.

Bemis & Call Hardware & Tool Co.

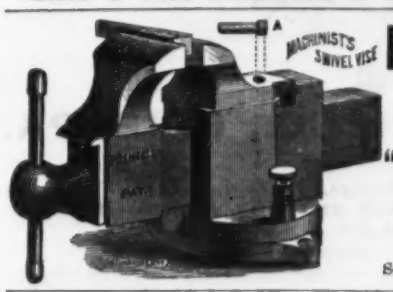

This Wrench can be furnished with Briggs' Pat. Nut or Sleeve.

PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench thus making a combination which has no equal.

For Circulars and Price List, address

REMIS & CALL HARDWARE & TOOL COMPANY, Springfield, Mass.



PRENTISS' PAT. VISES,

Adjustable Jaw.

Stationary or Pat. Swivel Bottoms.

ADAPTED TO ALL KINDS OF VISE WORK. ALSO

"PEERLESS" SWIVEL PIPE GRIP,

FITS ANY VISE. SOLD BY THE TRADE.

PRENTISS VISE CO.,

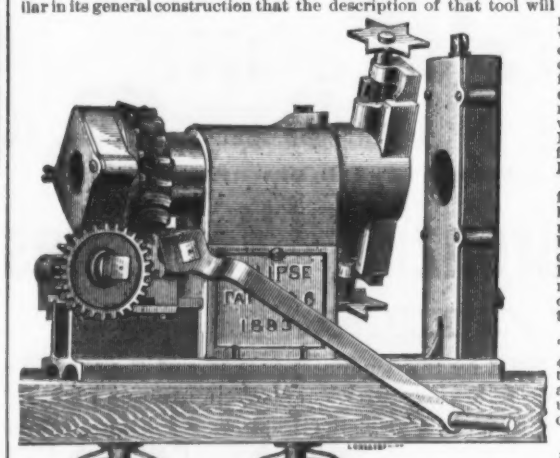
23 Dey Street, New York.

SOLE PROPRIETORS. SEND FOR CIRCULAR.

THE

"Junior" Eclipse Pipe-Cutting Machine

This Tool possesses all the advantages of the larger size "Eclipse" Machine, and is so similar in its general construction that the description of that tool will serve for the "Junior" also. It meets the requirements of those who have use for a Screwing Machine light enough to be readily carried about, sufficiently powerful in its gearing (18 to 1) to work easily, and strong enough to bear rough usage. All of these points, with the very important one of MODERATE COST, are to be found in the **"Junior" Eclipse Machine.**



It will cut off and thread Pipes from ¼ to 2-inch, inclusive; can be erected on any fence, box or plank in five minutes by simply boring two ¾ holes, and weighs, complete, about 125 pounds. It has no complicated parts and nothing to break or get out of order, and will do the work of a tool costing twice its price.

We offer it, as also the large size "Eclipse" (cutting pipes 2½ to 4 inch), with the understanding that if not found satisfactory after a fair trial it may be returned to us within thirty days and the purchase money will be refunded.

PRICE, Complete with Dies 1-4 to 2 inches, $60.

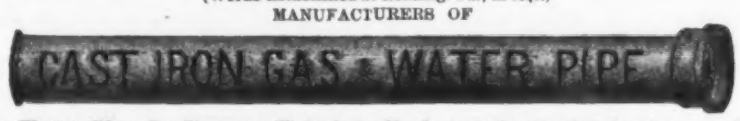
PANCOAST & MAULE,

243 & 245 So. Third St., PHILADELPHIA.

MELLERT FOUNDRY & MACHINE CO., LIMITED.

(Works Established at Reading, Pa., in 1848.)

MANUFACTURERS OF



Also Flange Pipe, for Steam or Water, of all sizes used. Special Castings, such as Branches, Bends, Reducers, Sleeves, &c. Stop Valves, Fire Hydrants, Retorts, Lamp Posts, &c.

The Improved Canada Turbine Water Wheel.

MACHINERY AND CASTINGS FOR

Furnaces, Rolling Mills, Mining Pumps, Hoists, &c.

CAR CASTINGS, GIRDERS, COLUMNS, BRACKETS, IRON RAILING, &c., &c.

GENERAL OFFICE AT READING, PA.

ROOF CRESTING AND FINIALS,

Weather Vanes, Tower Ornaments, &c.

WROUGHT IRON FENCES,

Iron Shutters, Window Guards, Jail Work, &c.,

BANK AND OFFICE RAILINGS,

WIRE and IRON WORK of Every Description.

☞ Send for Catalogue stating your wants, and we will make estimate. Mention this paper.

THE E. T. BARNUM WIRE & IRON WORKS,

Detroit, Mich., U. S. A.

Henderson's Patent Gas Furnace,

Realizes Perfect Utilization of Coal as Fuel,

PRODUCES INGOT IRON FREE OF CARBON and INGOT STEEL OF ALL GRADES OF CARBON,

From every kind of Pig Iron or Pig and Wrought Scrap Iron.

Apply to JAMES HENDERSON,

BELLEFONTE, CENTRE CO., PA.

THE CLARK M'F'G CO. MANUFACTURERS OF BUILDERS' HARDWARE BUFFALO, N.Y.

CHAMPION **HOG RINGER** RINGS and HOLDER.

Only double Ring ever invented. The only Ring that will effectually keep Hogs from rooting. No sharp points in the nose.

EAGLE BILL **CORN HUSKER** is the best Husker in the market. Farmers say it is the best. Use no other.

BROWN'S **HOG AND PIG RINGER and RINGS.** Only single Ring in the market that closes on the outside of the nose. No sharp points in the nose to keep it sore.

Ringers 75c. Rings, 40c. 12c. Holders, 75c. Huskers, 15c.

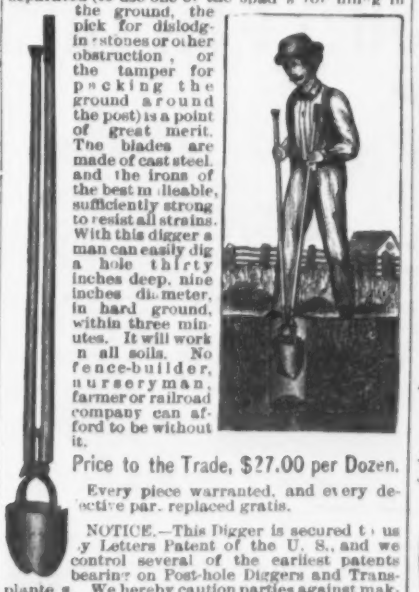
CHAMBERS, BERING & QUINLAN, Exclusive Manufacturers, Decatur, Ill

KOHLER'S LITTLE GIANT

Tree & Post-Hole Digger.

THIS IS A TOOL OF RARE MERIT;

in fact, a combination of tools—viz., tree and post-hole digger, transplanter, spade pick and tamping bar. The ease with which the spades are separated (to use one of the spades for filling in the ground, the pick for dislodging stones or other obstruction, or the tamper for packing the ground around the post) is a point of great merit. The blades are made of cast steel, and the irons of the best malleable, sufficiently strong to resist all strains. With this digger a man can easily dig a hole thirty inches deep, nine inches diameter, in hard ground, within three minutes. It will work in all soils. No fence-builder, nurseryman, farmer or railroad company can afford to be without it.



Price to the Trade, $27.00 per Dozen.

Every piece warranted, and every defective part replaced gratis.

NOTICE.—This Digger is secured to us by Letters Patent of the U. S., and we control several of the earliest patents bearing on Post-hole Diggers and Transplanters. We hereby caution parties against making, selling or using infringements of the same.

CHIEFTAIN HAY RAKE CO.,

SOLE MANUFACTURERS,

CANTON, - - OHIO.

PERFECTION WINDOW CLEANER.

Simple, Useful & Durable.

Saves 75 per cent. in time and labor over any other method.

This is the only perfect Glass and Window Cleaner yet devised. It has

TWO RUBBER STRIPS,

One an elastic cleaning edge, the other a yielding cushion or support. Has hollow iron handles to attach to pole.

We own all the Patents

embracing **any or all** of these principles, and shall prosecute parties found infringing, either by manufacture or sale of any other **Rubber Window Cleaner.**

Buy only the PERFECTION,

and you escape all infringements. See that our stamp and dates of patents are on every cleaner.

PERFECTION WINDOW CLEANER CO.,

232 La Salle St., CHICAGO, ILL.

CONCORD USE N.H. GENUINE **CONCORD AXLES**

Manufactured only by CONCORD AXLE CO.,

D. ARTHUR BROWN, Treasurer,

FISHERVILLE (CONCORD), N. H.

HAMMOND'S Window Springs

Lock and support upper and lower sashes—all sizes. Are very convenient, simple and durable. Sample to the Trade free.

W. S. HAMMOND,
Lewisberry, York Co., Pa.
Circulars give full instructions.

Grindstones, Emery, &c.

Walter R. Wood GRINDSTONES.

Berea, O., Nova Scotia, & other brands.

283 and 285 Front Street, New York.

GEO. CHASE,

The largest manufacturers in the world of

OIL STONE

Of all description.

107th Street and Harlem River,
Send for Illustrated Price List. **NEW YORK.**

OHIO GRINDSTONE COMPANY

JAMES NICHOLL, Prest. L. P. HALDEMAN, Secy.
J. M. WORTHINGTON, V. Pt. B. P. FOSTER, Treas.

Manufacturers of

GRINDSTONES

Of All Kinds.

127 Superior Street,

CLEVELAND, OHIO.

STANDARD VARNISH WORKS.

D. ROSENBERG & SONS,

734, 736, 738, 740 E. 14th St., NEW YORK. 243 Wabash Avenue, CHICAGO, ILL.

MANUFACTURERS OF JAPANS AND COPAL VARNISHES OF ALL DESCRIPTIONS.

Baking Japans and Bronzing Varnishes

SPECIALTIES.

Our Baking Japans and Bronzing Varnishes are being used by the leading consumers of these articles throughout this country and abroad, and we beg to refer to the following parties as to their superior qualities:

Singer Mfg. Co., Elizabethport, N. J., and Glasgow, Scotland.
Wheeler & Wilson Mfg. Co., Bridgeport, Ct.
American Sewing Machine Co., Philadelphia, Pa.
St. John Sewing Machine Co., Springfield, Ohio.
Medina Mfg. Co., Medina, N. Y.
New Home Sewing Machine Co., Orange, Mass.
Florence Sewing Machine Co., Florence, Mass.
Sargent & Co., New Haven, Ct.
P. & F. Corbin, New Britain, Ct.
Stanley Works, New Britain, Ct.
Landers, Frary & Clark, New Britain, Ct.
Eaton, Cole & Burnham Co., Bridgeport, Ct.
Norwalk Lock Co., Norwalk, Ct.
Bradley & Hubbard Mfg. Co., Meriden, Ct.
Charles Parker Co., Meriden, Ct.
Washburn & Moen Mfg. Co., Worcester, Mass.
Trenton Lock and Hardware Co., Trenton, N. J.
Peck, Stow & Wilcox Co., Southington, Ct., and Cleveland, Ohio.
Shurmer & Massey Mfg. Co., Cleveland, Ohio.
Elbell, Gilliam & Co., Canton, Ohio.
Livingston & Co., Pittsburgh, Pa.
James Smart Mfg. Co., Brockville, Canada.
Burrows, Stewart & Milne, Hamilton, Canada.
R. M. Wanzer & Co., Hamilton, Can.
Buffalo Hardware Co., Buffalo, N. Y.
Sidney Shepard & Co., Buffalo, N. Y.
Enterprise Mfg. Co., Philadelp'a, Pa.
E. & T. Fairbanks & Co., St. Johnsbury, Vt.
Buffalo Scale Co., Buffalo, N. Y.
Jos. Barnhurst, Philadelphia, Pa.
Van Wagoner & Williams, New York, and many others.

PHILADELPHIA SCREW CO., Limited,

Twelfth and Buttonwood Sts., PHILADELPHIA,

MANUFACTURERS OF

IRON AND BRASS

WOOD SCREWS

OF EVERY DESCRIPTION.

Quality, finish and tests as to strength guaranteed equal to any in the market.

Desiring to give the fullest advantage to our customers, we have withdrawn all our accounts from Commission Houses, and solicit direct correspondence from Dealers in all parts of the country.

Having placed an additional 100-Horse-Power Engine, and with otherwise improved facilities and largely increased capacity for production, we can fill orders promptly, and invite inquiries for discounts.

A FULL LINE IN STOCK.

Colliau Patent Cupolas.

The Advantages of the Colliau Improvements are:

1. A saving of from 20 to 50 per cent. of fuel by securing more perfect combustion at the melting point.
2. The iron is improved by the melting and a pure uniform metal is obtained.
3. Much greater rapidity of fusion, often doubling the ordinary cupola capacity.
4. Hot fluid iron all through the heat.
5. The cupola can be worked by unskilled workmen if instructions are followed.
6. Concentration of the fires in the smallest possible compass. The metal in fusion has less space to traverse while exposed to the oxydizing influence of the blast. This insures tougher castings and less waste by oxidation in the furnace.
7. The improvements can be applied to ordinary cupolas in a few days and without difficulty.
8. By this process the cupola does not clog. Melting is practically continuous as long as desired—100 tons of iron have been melted in one 58-inch cupola in six and one-half hours, and the cupola remained in perfect condition to the end.
9. A perfect "chilling iron" can be relied on when desired.
10. In the practical use of this cupola there is no fire to be seen at the loading doors, and no throwing off of combustible gases, carbonic acid gas alone escaping, the top of the cupola being as cool as if there was no fire below.

As a result of these improvements, it is claimed that the work of the Colliau cupolas has never been equaled in the quantity of metal melted in a given time, in the quantity melted in a given size of cupola, in economy of fuel used to the ton of iron in melting, in the ease and certainty of melting, in continuous melting as long as desired, in giving perfect castings to the end, in freedom from clogging or "hanging."

COLLIAU FURNACE COMPANY,
Foot of Mt. Elliott Ave., DETROIT, MICH.

Jarecki's Screw Plate and Pipe Cutter.

☞ WRITE FOR DISCOUNT AND DESCRIPTION.

No. 1 Cuts off and Threads ¼, ⅜, ½, ⅝, ¾..... $14.00
No. 2 " " ⅜, ½, ¾, 1, 1¼ 16.00
No. 3 " " 1, 1¼, 1½, 2 ..... 20.00
No. 3½ " " ⅜, ½, 1, 1¼, 1½, 2... 22.50
No. 4A Cuts off and Threads 1½, 2, 2½ 3..... $35.00
No. 4B " " 2½, 3, 3½, 4..... 50.00
No. 5 " " 4½, 5, 6..... 75.00

JARECKI MANUF'G CO., ERIE, PA.,

MANUFACTURERS OF

Malleable and Cast-Iron Pipe Fittings, Brass and Iron Valves and Cocks for Steam, Gas, Water and Oil; Pumps, Machinery and Supplies for Artesian Wells.

☞ ILLUSTRATED CATALOGUE ON APPLICATION.

Imperial Club Skate.

The CHEAPEST, most RELIABLE, DURABLE and CONVENIENT Self-Adjusting Skate Ever Made.

Can be Changed to Boots varying in Size INSTANTLY by a Simple Movement of the Latch.

No WRENCHES, KEYS, SCREWS or NUTS to be Lost.
This Skate is entirely ORIGINAL in Detail and Combination.

MACOMBER, BIGELOW & DOWSE,
Sole Agents for the United States,
229 Franklin Street, - - - - - BOSTON, MASS.

LOWE'S METALLIC PAINT CO.,

CHATTANOOGA, TENN.,

OFFER TO CONSUMERS

THE BEST METALLIC PAINT MANUFACTURED IN THE UNITED STATES.

We have OVER 1000 CERTIFICATES from Railroad Officers, Wagon and Agricultural Implement Makers, Car Builders, Tin and Sheet Iron Roofers, Wrought Iron Bridge Companies and Blast Furnaces. We guarantee IT TAKES 25 PER CENT. LESS OIL, has more body and better covering properties than any other metallic paint.

For sale by the principal paint dealers and hardware merchants in the United States.

PERFORATED SHEET METALS

For Elevators, Malt Kiln Floors, Grain Dryers, Threshers, Separators, Corn Shellers and all kinds of Grain Cleaning Machinery; also for Mining and Concentrating Works, Coal, Coke and Ore Screens, Gas and Water Works, Paper, Woolen, Flour and Oil Mills, Filters, Strainers, Ventilators, etc. PERFORATED TIN AND BRASS of all sizes. Special attention given to work for Railroads and Car-Builders. **Iron, Steel, Copper, Brass and Zinc Punched to any size and thickness required.** Correspondence solicited.

THE HARRINGTON & KING PERFORATING CO.,
Main Office and Works, Nos. 43 to 51 S. Jefferson St., CHICAGO.
Branch Office, 100 Beekman St., New York.

HILL'S Eureka Dryer.

THE BEST In the Market
For Indoor Use.
Also Manufacturers of
HILL'S CHAMPION DRYER.
For illustration see last *Iron Age*. Circulars and discounts to the trade on application.

HILL DRYER CO.,
Worcester, Mass.

PATENT APPLIED FOR.

BARNES'
Patent Foot and Steam Power Machinery. Complete outfits for Actual Workshop Business. Lathes for Wood or Metal, Circular Saws, Scroll Saws, Formers, Mortisers, Tenoners, &c., &c. Machines on trial if desired. Descriptive Catalogue and Price List free.
W. F. & JOHN BARNES, Rockford, Ill.
No. 2046 Main St.

IRON ROOFING.

Extra quality. Best plan in use. Sold as low as any other

MANUFACTURED BY

T. C. SNYDER & CO., Canton, Ohio.

Cheap, strong and durable. Does not get out of repair. Every roof sold in seven years satisfactory. Any mechanic can apply it. Circular and sample free.

Also manufacturers of the best and cheapest **Metallic Paint** in use.

R. H. WOLFF & CO.,

MANUFACTURERS OF

STEEL WIRE

FOR ALL PURPOSES.

Special Finest CAST STEEL WIRE.

Market Steel Wire, Prime Coppered Spring Wire, Tempered and Untempered Steel Wires, In Long Lengths, for Crineline, Corset, Lock and Brush Makers, and all Special Purposes.

ALL KINDS OF FURNITURE SPRINGS.

IMPORTERS OF

IRON, STEEL, & RAILS of Every Description.

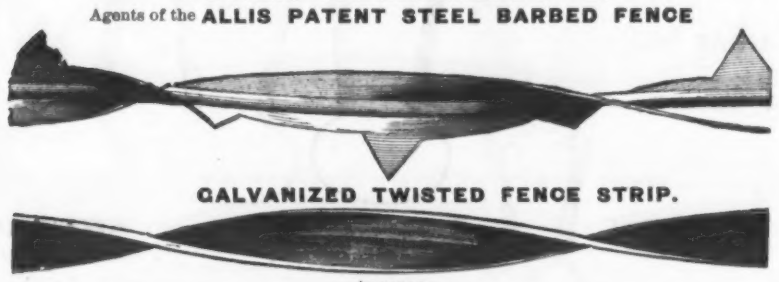
Wire Rods, Plain and Galvanized Wires, &c., Gun Barrels, Moulds, and Ordnance.

Shipments in bond from American Ports, and direct from Europe to all parts of the World.

EXPORTERS AND GENERAL MERCHANTS.

WORKS, PEEKSKILL, N. Y.

Agents of the **ALLIS PATENT STEEL BARBED FENCE**



GALVANIZED TWISTED FENCE STRIP.

ADDRESS,

Office and Warehouse, 93 John Street, New York.

MILLER, METCALF & PARKIN,

Pittsburgh, Pa.,

Manufacturers of

CRESCENT STEEL,

In Bars, Sheets, Cold-Rolled Strips, &c.

Polished, Compressed Drill Rods and Wire,

Warranted equal to any imported in *quality, finish and accuracy.*

Also Common Grades.

J. & RILEY CARR,

SHEFFIELD, England.

ESTABLISHED 1810.

Sole Importers and Manufacturers of the

Celebrated "Dog Brand"

STEEL FILES.

BRIGHT COLD ROLLED STEEL,

PATENT WROUGHT IRON STEEL FACE ANVILS,

FARRIERS' KNIVES, HAMMERS, PINCERS, &c.

Warehouse: 30 Cold St., New York. HENRY W. BELCHER, Agent.

S. & C. WARDLOW,

Sheffield, England,

Manufacturers of the Celebrated

Cast and Double Shear STEEL.

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table Knives, Mining Tools, Dies, Files, Clock and other Springs, and Tools of every variety.

Warehouse, 95 John Street, New York.

WILLIAM BROWN, Representative.

CLEVELAND ROLLING MILL CO.,

MANUFACTURERS OF

Bessemer Steel and Iron Rail and Fastenings,

SPRING STEEL AND WIRE OF ALL KINDS,

TIRE, AXLES AND OTHER FORGINGS,

Boiler Plate, Galvanized and Black Sheet Iron, Corrugated Roofing and Siding of Siemens-Martin, Bessemer Steel and Iron,

CLEVELAND, OHIO.

Western Agency, 91 Lake St., CHICAGO. N. D. PRATT, Agent.

New England Agency, 239 Franklin St., BOSTON. JOHN WALES & CO., Agents.

New York Agency, 23 Astor House, C. DICKERSON, Agent.

W. W. SCRANTON, President. WALTER SCRANTON, Vice-President. E. P. KINGSBURY, Sec'y and Treas.

THE SCRANTON STEEL COMPANY,

MANUFACTURERS OF

STEEL RAILS & BILLETS.

Works at Scranton, Pa.

New York Office, - - - - 56 Broadway.

THE MIDVALE STEEL CO.,

NICETOWN, PHILADELPHIA.

Best Warranted Cast Steel for Machinists' Tools,

Taps, Dies, Punches, Shear Blades, Chipping Chisels and Granite Rock Drills,

Extra Mild Center Steel, special for Taps;

ALSO,

MACHINERY AND CAST SPRING STEEL HEAVY AND LIGHT FORGINGS.

Warehouse, No. 12 North 5th St., Philadelphia.

Address *A. M. F. Watson,* General Sales Agent.

STEEL Gautier Steel.

See Page 3.

LABELLE STEEL WORKS.

SMITH, SUTTON & CO.,

MANUFACTURERS OF ALL KINDS OF

STEEL.

Also Springs, Axles, Rake Teeth, &c.

OFFICE & WORKS, Ridge, Lighthill & Belmont Sts., & Ohio River, Allegheny.

Post Office Address, PITTSBURGH, PA.

Represented at Boston by WETHERELL BROS., 31 Oliver St.; at Philadelphia by JAMES C. HAND & CO., 614 and 616 Market St. at Cleveland by CONDIT, WICK & CO., 143 Water St.

ALBANY & RENSSELAER IRON & STEEL CO.,

TROY, N. Y.,

MANUFACTURERS OF

BESSEMER STEEL RAILS,

FISH PLATES, BOLTS, NUTS, SPIKES, &C.

Machinery Steel, Merchant and Ship Iron.

CHESTER GRISWOLD, Vice-President, - 56 Broadway, New York City.

BOND, PARSONS & CO.,

104 John St., NEW YORK. 224 So. 3d St., PHILADELPHIA.

AMERICAN AND FOREIGN PIG IRON,

Spiegeleisen, Blooms, Rails, Wire Rods, &c.

TIN PLATES.

VIVIAN, YOUNGER & BOND, London & Birmingham.

FRANCIS HOBSON & SON,

97 John Street, NEW YORK.

Sole Manufact'rs of **"CHOICE"** Extra Cast Steel.

Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

Don Works, Sheffield, England.

CHAS. HUGILL, Agent.

ANDERSON, DU PUY & CO.,

(Successors to ANDERSON & CO.), Manufacturers of all Descriptions of

Tool, Machinery, **STEEL.** Agricultural, &c.

Works and Office at Chartiers Station, P. & L. E. R. R. Branch Office, Cor. Ross & First Aves.,

PITTSBURGH, PA.

C. W. LEAVITT, New York Agent, **161 Broadway.** | M. T. MILES & SON, Western Agents, **170 Lake St., Chicago.**

Heavy Iron & Steel Forgings,

MILLER FORGE AND IRON CO., Limited.

REPRESENTED BY

TEMPLE & LOCKWOOD, 12 Platt St., NEW YORK.

Warranted Superior to any Steel in the Market, either English or American, for every purpose.

Also,

Combination Chrome Steel and Iron for Safes, Jails and Deposit Vaults.

Send for Circular and Price List

CHROME CAST STEEL.

Chrome Steel Works,

Kent Avenue and Keap Street,

BROOKLYN, E. D., N. Y.

Chicago Branch,

S. D. KIMBARK, Agent.

Cincinnati Branch,

N. E. cor. 5th & Main Streets.

THE MONTOUR IRON & STEEL COMPANY.

WORKS AT DANVILLE, PA.

PIG IRON, T AND STREET RAILS,

A general assortment of mine and narrow gauge rails kept on hand from which shipments can be made promptly.

W. E. C. COXE, President, Reading, Pa. S. W. INGERSOLL, Treasurer, 208 South Fourth St., Philadelphia, Pa.

PITTSBURGH BESSEMER STEEL CO.

(LIMITED),

STEEL RAILS

LIGHT RAILS A SPECIALTY.

P. O. Address, **87 Wood Street, Pittsburgh, Pa.**

CROWN STEEL,

CASSIDY & CO., Mfrs., Pittsburgh, Pa.

WARRANTED EQUAL TO ANY PRODUCED.

Best refined Cast Steel, for Edge and Turning Tools, Taps, Dies, Drills Punches, Shear Knives, Cold Chisels and Machinists' Tools. Also Machinery Steel and Forgings,

HICKS & DICKEY, Gen'l Agents, 413 Commerce St. Philadelphia.

Represented in New York by F. L. Froment & Co., 112 John Street.

Represented in Boston by Bellows & Mansion, 77 Oliver Street.

Represented in Atlanta, Ga., by Davenport, Johnson & Co.

R. MUSHET'S

Special Steel

FOR

LATHES, PLANERS, &c.

Turns out at least **double work** by increased speed and feed **and cuts harder metals** than any other Steel. Neither hardening nor tempering required.

Sole Makers,

SAMUEL OSBORN & CO.,

Sheffield, England.

Represented in the United States by

B. M. JONES & CO.,

Nos. 11 & 13 Oliver Street, **BOSTON.**

NAYLOR & CO.,

99 John St., New York. 6 Oliver St., Boston, Mass.

208 S. Fourth St., Philadelphia, Pa.

IMPORTERS OF

STEEL AND IRON RAILS,

Tin and Terne Plates,

Swedish and Norway Iron,

BESSEMER STEEL WIRE RODS.

Pig Iron, Spiegeleisen, Ferromanganese, Scrap Steel and Old Iron Rails.

MANUFACTURERS OF

STEEL COMPRESSED SHAFTING,

"Benzon" Homogeneous Plates

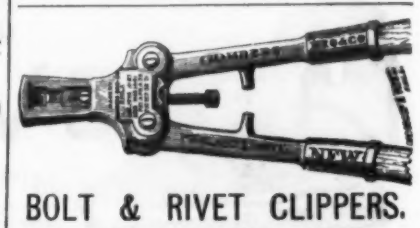
For Boilers, Fire-boxes, &c.

Axles, Crank Pins, Spring Steel,

And all other kinds of

Martin-Siemens Steel and Iron

For Railroad purposes.



BOLT & RIVET CLIPPERS.

For cutting off the ends of Bolts and Rivets, on carriages, wagons, harness, etc. Ask for them where you buy your hardware, or send for circular and price list.

CHAMBERS, BROTHER & CO.,

52d St., below Lancaster Ave.,

Philadelphia, Pa.

THE VERONA TOOL WORKS.

METCALF, PAUL & CO.,

Manufacturers of

Solid Steel Mining and Railroad Picks, Blacksmith's Sledges, Striking Hammers, Woodchopper's Wedges and Sledges,

Mining, Quarry and Railroad Tools of the best material and workmanship only. All tools are stamped with our name and trade mark, and fully warranted.

Pittsburgh, Pa., 7th Avenue and Liberty Street.

Western Branch, CHICAGO, ILL., 22 West Lake St.

F. W. MOSS,

CELEBRATED and OLD-ESTABLISHED BRANDS OF

"MOSS" and

"MOSS & GAMBLE'S

STEEL AND FILES

Office and Warehouse:

80 JOHN ST., - - New York.

Established 1838.

Bevin Bros. Mfg. Co.,

Easthampton, Ct.

Manufacturers of

SLEIGH BELLS,

House, Tea, Hand, Gong Bells, &c.

Bell Metal Kettles.

A. PARDEE, Hazleton, Pa. J. G. FELL, Phila.

A. PARDEE & CO.,

237 South Third Street.

PHILADELPHIA,

No. 111 Broadway, New York,

MINERS AND SHIPPERS OF

Lehigh Coals.

The following superior and well-known Lehigh Coals are mined by ourselves and firms connected with us, viz.:

A. Pardee & Co. { HAZLETON, CRANBURY, SUGAR LOAF.

Pardee, Bro. & Co. LATTIMER.

Calvin Pardee & Co. HOLLYWOOD.

Pardee, Sons & Co. MT. PLEASANT

ESTABLISHED IN 1859.

THE IRONMONGER AND METAL TRADES ADVERTISER

PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 42a CANNON STREET, LONDON, E. C.

ADVERTISEMENTS AND SUBSCRIPTIONS ARE RECEIVED AT THE VARIOUS OFFICES OF "THE IRON AGE," NAMELY:

NEW YORK OFFICE: DAVID WILLIAMS, Publisher of *The Iron Age*, 83 Reade street, who will, on receipt of application, supply specimen copies free.

PITTSBURGH OFFICE: 77 Fourth Avenue—JOS. D. WEEKS, Manager and Associate Editor.

PHILADELPHIA OFFICE: 220 South Fourth Street—THOMAS HOBSON, Manager.

CINCINNATI OFFICE: 55 West Fourth Street.

SOUTHERN OFFICE: Cor. Eighth and Market Streets, Chattanooga, Tenn.—S. B. LOWE, manager.

CHICAGO OFFICE: 36 Clark Street, Cor. Lake Street—HENRY SMITH, Manager.

SPECIAL FEATURES.

Notes of Novelties.—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated.

Special Correspondents.—The *Ironmonger* has a deserved reputation for its special correspondence from all the principal Continental, British and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities for acquiring information specially suited for the columns of the *Ironmonger*. ***The Week. Legal News, Trade Notes, Bankruptcies, Foreign Notes, Colonial Jottings, Mercnants' Circulars, &c***, are each departments of the journal containing a digest of all matters of direct interest to the Iron, Hardware and Metal Trades. In additon to the above, there is a carefully classified list of Patents, together with Editorial Notes, French, Belgian and other Special Correspondence.

SUBSCRIPTIONS

to the *Ironmonger and Metal Trades' Advertiser*, with which is sent every fourth week the Foreign Supplement (see below), may commence from any date, but are not received for less than a year complete. The rate is $5 per annum, inclusive of postage to any part of the world outside Great Britain. To every subscriber is presented, free, in the course of his year, a handsome and useful ***Ironmongers' Diary and Text Book,*** a work sold to non-subscribers at 75 cents.

By a mutual clubbing arrangement between the two journals, subscriptions to both will be received by either *The Ironmonger* or *The Iron Age* on the following terms:

THE IRONMONGER and THE IRON AGE, Weekly.

In the United States and Canada.....$7.50 or £1.10s | In Great Britain and Ireland.....$5.50 or £1.2s | In other countries.....$8.co or £1.12s

THE IRONMONGER, Weekly, and THE IRON AGE, Monthly.

In the United States and Canada.....$5.75 or 23s | In Great Britain and Ireland.....$3.25 or 13s | In other countries.....$5.75 or 23s

ADVERTISEMENTS

are inserted in the *Ironmonger and Metal Trades' Advertiser* at the subjoined rates, from which no variation can be made on any ground whatever.

Size of Page—Nine Inches Deep by Six Inches Wide.

One Advertisement of every Series of 13 Monthly, 27 Fortnightly, or 53 Weekly, will be inserted in the Ironmongers' Diary and Text Book, published toward the end of each year, and presented to every Subscriber.

	53 INSERTIONS, each net.	27 INSERTIONS, each net.	13 INSERTIONS, each net.	7 INSERTIONS, each net.	3 INSERTIONS, each net.	1 INSERTION, net.
One page	$20.00	$22.50	$25.00	$30.00	$35.00	$50.00
Two-thirds page	15.00	16.90	18.75	22.50	26.25	37.50
Half page	11.00	12.40	13.75	16.50	19.25	27.50
One-third page	8.00	9.00	10.00	12.00	14.00	20.00
Quarter page	6.40	7.25	8.00	9.60	11.20	16.00
One-sixth page	4.50	5.10	5.65	6.75	7.75	11.30
One-eighth page	3.60	4.10	4.50	5.40	6.25	9.00
One-sixteenth page	2.00	2.25	2.50	3.00	3.50	5.00

SPECIAL ISSUES.

In the spring and autumn of each year there is published a special issue, the circulation of which is not less than **Twelve Thousand (12,000)** copies

THE IRONMONGERS' DIARY AND TEXT BOOK.

This is an annual, **presented free to every Subscriber to the IRONMONGER AND METAL TRADES' ADVERTISER.** It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to year. It is handsomely bound in cloth, gilt; and as copies are used in thousands of establishments for a whole year, it is obviously a medium of exceptional value for advertisements. Sold to non-subscribers at 75 cents.

THE FOREIGN SUPPLEMENT,

With which is incorporated The Universal Engineer,

is published every fourth week in connection with the extensive and world-wide circulation of the *Ironmonger* itself. The dates of its publication for next twelve months will be as follows:

JULY 21, AUGUST 18, SEPTEMBER 15, OCTOBER 13, NOVEMBER 10, DECEMBER 8, 1883, JANUARY 5, FEBRUARY 2, MARCH 1 and 29, APRIL 26 and MAY 24, 1884.

This supplement is published in

FOUR LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the *Ironmonger* not only within reach, but in the native language of eighty millions of *German*, twenty-eight millions of *Italian*, and fifty-one millions of *Spanish* speaking people; or, in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

Advertisements are inserted in *any* language at the following

MODERATE TARIFF.

Size of Page—13¼ Inches Deep by 9½ Inches Wide.

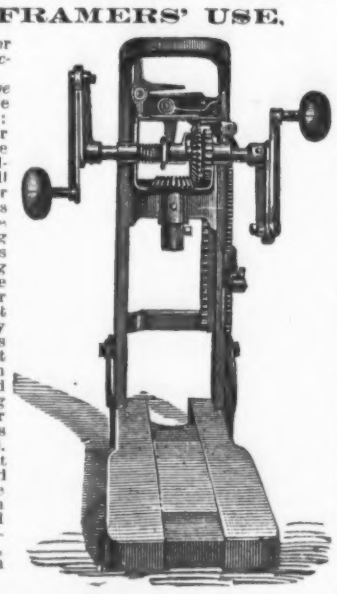
	13 INSERTIONS, each net.	7 INSERTIONS, each net.	3 INSERTIONS, each net.		13 INSERTIONS, each net.	7 INSERTIONS, each net.	3 INSERTIONS, each net.
One page	$30.00	$33.75	$37.50	Quarter page	$10.00	$11.25	$12.50
Two-thirds page	22.00	24.75	27.50	One-sixth page	7.50	8.45	9.40
Half page	17.00	19.15	21.25	One-eighth page	6.20	7.00	7.75
One-third page	12.50	14.10	15.65	One-sixteenth page	3.20	3.40	4.00

Advertisers will do well to use Illustrations freely. Where economy of space is an object, a left page illustrated and described in one language can be suitably described in four or more languages on the opposite or right page without illustrating.

THE WHOLE FOREIGN HARDWARE TRADE,

so far as our experience of more than twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertisement inserted in the *Ironmonger* and FOREIGN SUPPLEMENT is a strikingly powerful and most efficient way of publicity, not to be compared with any of the other ordinary channels of communication.

SAUNDERS' PATENT
AUTOMATIC BORING MACHINES
FOR BUILDERS' AND FRAMERS' USE.



are universally acknowledged to be superior to all other *Boring Machines*, and we *guarantee* to give better *satisfaction* than any other machine.

Ship Builders, House Builders, Dock Builders, Bridge Builders, Carpenters and *Farmers* please notice what we claim for our machine, and we guarantee all thatwe claim: First, that it will do nearly double the work of any other machine in the same length of time, with greater ease to the operator; that we can regulate the speed of the bit according to the size of the same, or to suit the operator; it will drive the bit any required speed; it will drive the bit or auger to any required depth, and the bit or auger returns from the hole by the same automatic motion without the operator stopping the machine; at the same time clearing itself and leaving the hole entirely free from chips; it is gauged to bore such a depth as may suit the operator, boring two or more holes at exactly the same depth after being once set, without any attention from the operator; it is an angular machine and will bore on any angle: it is the most compact machine; it can be placed in so small a compass as to occupy but little room in a carpenter's tool chest, and while in this compact form it can be carriedin the hand with the greatest ease and convenience; it is the most durable machine, from the fact that we use the best material in its construction, and each part can be duplicatedin case of accident by send ing directly to us. We finish the ironwork with a baked or heated Japan finish which enables it to withstand all kinds of weather, the woodwork being rubbed in oil and shellaced. They are the cheapest Boring Machines in the world for what they can do. We are introducing the Gladwin Improved Auger in connection with this machine. This auger is the best Boring Machine Auger made, being a self-clearer in gummy or knotty wood. We offer the Borer, boxed and delivered on board cars, for **$6.** with full set Gladwin Improved Augers, 13 qrs., **$9**; or with extra finished beds, **$6.50,** and full set augers, 13 qrs., **$9.50.** A discount given for large orders. Send for Descriptive Catalogue.

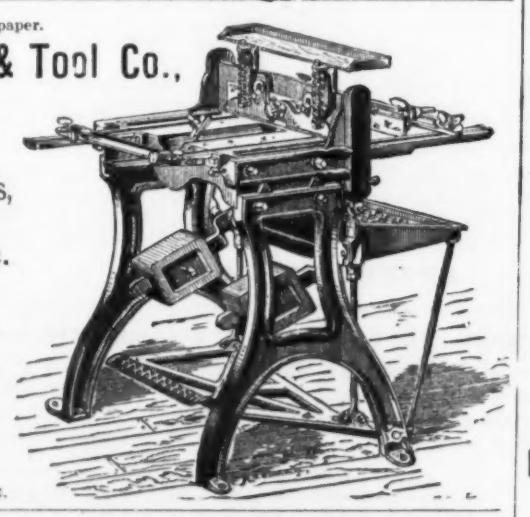
THE W. B. WELLS MFG. CO., Ashaway, R. I.

FOR SALE BY

LOUDERBACK, GILBERT & CO., 33 Chambers St., New York.
TALLMAN & McFADDEN, 607 Market Street, Philadelphia.
BUHL, SONS & CO., Detroit, Mich.
A. W. BINGHAM & CO., Cleveland, Ohio.
GORDON HARDWARE CO., San Francisco, Cal.
HODGE & HOMER, 47 Randolph Street, Chicago Ill.

Please mention this paper.

Niagara Stamping & Tool Co.,



MANUFACTURERS OF

PRESSES, DIES AND TOOLS

For working Sheet Metal,

Fruit Can Dies & Tools,

CANNERS' OUTFITS,

Squaring Shears, &c.

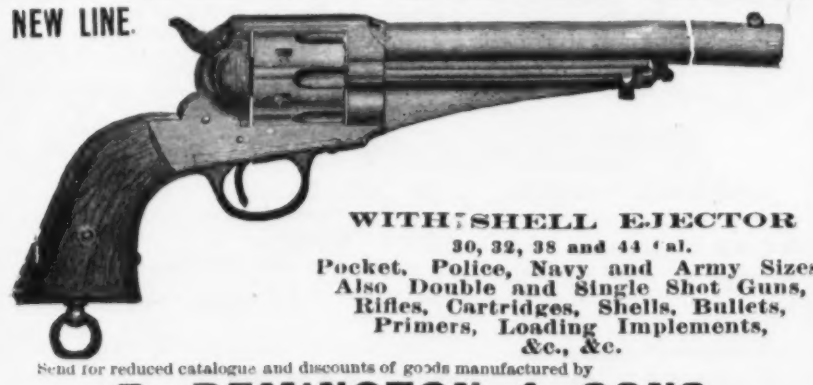
Siegrist's Patent Rotary Pumps,

FOR BREWERS, &c.

147 & 149 ELM ST.,
BUFFALO, N. Y.

Write for our Catalogue and Price List.

NEW LINE.



WITH SHELL EJECTOR

30, 32, 38 and 44 Cal.

Pocket, Police, Navy and Army Sizes. Also Double and Single Shot Guns, Rifles, Cartridges, Shells, Bullets, Primers, Loading Implements, &c., &c.

Send for reduced catalogue and discounts of goods manufactured by

E. REMINGTON & SONS,
283 Broadway, - - - - NEW YORK.

WROUGHT IRON TACKLE BLOCKS,

Swivel Hooks for Rope or Chain,

POLISHED GROOVES, ALL SIZES IN STOCK.

Also Pulley Blocks for Wire Rope,

Headquarters for the

IRVING BRAND WOODEN PULLEY BLOCKS,

McCOY & SANDERS, Manuf'turers,

26 Warren Street, New York.

Western Office, 36 Sixth Street, Pittsburgh, Pa.

MASTER-KEYED BRASS PADLOCKS, in sets of any required number, made to order. Each lock has 2 *special keys*, which will unlock no other. Each *Set* has a *Master-Key* which will open the whole set—a great convenience in all shops and factories. Thousands in use. Satisfaction invariably given.

All who use **PADLOCKS FOR SECURITY** should examine **"Miller's 6-Lever,"** of which there are now made nearly 20 modifications. The *Franklin Institute* has awarded to the inventor the *John Scott Medal* and *Premium*, for account of the Board of City Trusts of the City of Philadelphia.

FAIRBANKS & CO., Agents, 311 Broadway, New York.

New Orleans, Pittsburgh, Buffalo, Albany, Philadelphia Baltimore, &c.

CLEVELAND

IRON ORE PAINT COMPANY,

Manufacturers of

PURE IRON ORE PAINTS,

Red (Rossic) Purple and Brown.

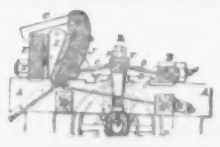
We guarantee all our Paints, and respectfully solicit the patronage of consumers and dealers. Send for Price List 22.

Office, 154 Merwin St., Cleveland, O.

BEST IRON PAINT.

BLAKE CRUSHER CO.,

New Haven Conn.



BLAKE'S

Challenge Rock Breakers

Patented Nov. 18, 1879.

See *The Iron Age* first issue of the month.

GEO. B. CARPENTER & CO

DEALERS IN

SUPPLIES

FOR ROLLING MILLS

MANUFACTORIES

MINING

COMPANIES

& RAILWAYS

WESTERN AGENTS FOR

H. W. JOHNS'

ASBESTOS

LIQUID PAINTS

STEAM PACKING, MILL BOARDS

ROOFING, BOILER COVERING

GASKETS, FIRE PROOF COATINGS

CEMENTS & C.

SEND FOR CIRCULARS

202 & 208 S. WATER ST. CHICAGO.

MENTION THIS PAPER

AGENTS IN ALL FOREIGN COUNTRIES.

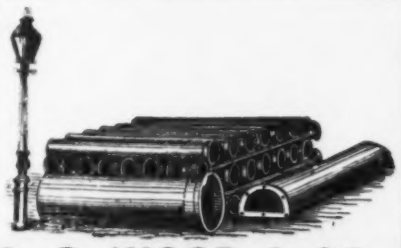
HOWSONS PATENT OFFICES

119 South Fourth Street,
PHILADELPHIA

Branch Office, 605 Seventh St. Washington, D. C.

H. HOWSON, Engineer and Solicitor of Patents.
C. HOWSON, Attorney at Law and Counsel in Patent Cases.

SEND FOR CIRCULARS.



R. D. WOOD & CO.,

Philadelphia,

Manufacturers of

Cast Iron Pipe

FOR WATER AND GAS,

Lamp Posts, Valves, &c.,

Mathew's Pat. Anti-Freezing Hydrants.

400 CHESTNUT STREET.

THE LITTLE GIANT

Wagon Tire Upsetter.

The Cheapest and Best.

LITTLE GIANT MFG CO.,

Send for Circular. Millport, N. Y.

NELLIS, McINTIRE & CO.

PITTSBURG, PA.

Manufacturers Nellis' Electric Spring Agitators, For Cultivators, Harrows, Seeders and Smoothing Harrows.

Nellis' Original Harpoon Horse Hay Fork, Nellis' Grapple and Wood Wheel Pulleys, Nellis' Cast Tool Steel Castings, Nellis' Ornamental Fencings, Railings and Crestings, Agricultural Steels of all kinds. Crucible Cast, Iron Centers, and Open Hearth Steels Post Augers and Diggers, &c.

ICE CREAM FREEZERS,

TORREY'S PATENT,

S. ROEBUCK & CO.,

Manufacturers,

164 FULTON ST.,

NEW YORK.

MACHINERY FOR

Straightening and Cutting Wire

Of all Sizes to any Length.

Send for Catalogue.

JOHN ADT,

New Haven, Conn., U. S. A.

Prouty's Patent
PEERLESS FORCE PUMP.

Has Self-Adjustable Foot Rest.

NEW AUTOMATIC COMPENSATING PACKING.

It will throw a continuous jet FROM FORTY TO SIXTY FEET. A new pattern jet and spray nozzle is sent with each pump.

Especial attention is called to the material and workmanship exhibited in these pumps.

LIST PRICE, $8.

THE NEW ENGLAND BUTT CO.

PROVIDENCE, R. I.

NEW YORK OFFICE, 99 Chambers St.

THE AMERICAN BOLT AND SCREW CASE CO.,

DAYTON, - - - OHIO.

MANUFACTURERS OF

REVOLVING BOLT AND SCREW CASES.

We are the only manufacturers of Bolt cases and the only parties who make lists of Bolt or Screw Cases to suit stock of purchaser without extra charge. All goods guaranteed Send for Illustrated Circular.

PRINCIPAL AGENTS.

Markley, Alling & Co., Chicago; Ducharme, Fletcher & Co., Detroit, Mich.; Burger & Baumgard, New York City; Lloyd, Supplee & Walton, Philadelphia, Pa.; Buehler, Bombright & Co., Philadelphia, Pa.; Samuel C. B. Cook & Co., Baltimore, Md.; Bindley Hardware Co., Pittsburgh, Pa.; A. F. Shapleigh & Cantwell Hardware Co., St. Louis, Mo.; Farwell, Ozmun & Jackson, St. Paul, Minn.; Howell, Gano & Co., Cincinnati, O.; Pappenheimer Hardware Co., Cincinnati, O.; Hall & Willies Hardware Co., Kansas City, Mo.; Pratt & Co. Buffalo, N. Y.; Seeberger, Breakey & Co., Chicago, Ill.; H. O. Stratton, Boston, Mass.; Shuls & Hosen, St. Joseph, Mo.; Wyeth Hardware Co., St. Joseph, Mo.; A. Baldwin & Co., New Orleans, La.; Gorden Hardware Co., San Francisco, Cal.; Kilbourn, Jones & Co., Columbus, O.; Morley Bros., East Saginaw, Mich.

We are also extensive manufacturers of **Fruit Can Sealing Wax.** Send for Circulars and Prices.

Very Respectfully,

THE AMERICAN BOLT & SCREW CASE CO.

MORSE TWIST DRILL AND MACHINE CO.

NEW BEDFORD, MASS., Sole Manufacturers of

Morse Patent Straight-Lip Increase Twist Drill,

Beach's Patent Self-Centering Chuck, Solid and Shell Reamers,

BIT STOCK DRILLS,

DRILLS FOR COES, WORCESTER, HUNTER AND OTHER HAND DRILL PRESSES. BEACH'S PATENT SELF-CENTERING CHUCKS, CENTER AND ADJUSTABLE DRILL CHUCKS, SOLID AND SHELL REAMERS. DRILL GRINDING MACHINES. TAPER REAMERS, MILLING CUTTERS AND SPECIAL TOOLS TO ORDER.

All Tools exact to Whitworth Standard Gauges.

GEO. R. STETSON, Supt. EDWARD S. TABER, Treas.

BEECHER & PECK

Successors to Milo Peck, Manufacturers of

PECK'S DROP PRESS

PECK'S DROP LIFTER is the only one which has its parts cushioned. Being thus cushioned they are the most durable Lifter in the market.

Can be attached to any drop now in use.

Send for Illustrated Catalogue.

Cor. Lloyd and River Sts. **New Haven, Conn.**

MATTHIESSEN & HEGELER ZINC COMPANY,

LA SALLE, ILLINOIS,

MANUFACTURERS OF

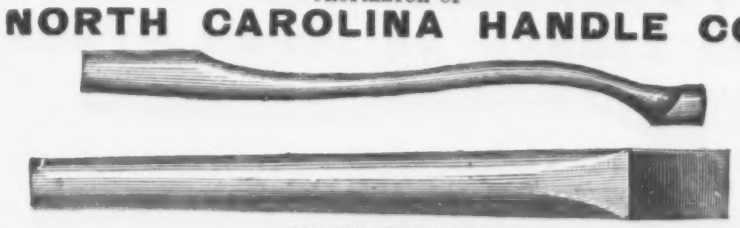
Refined Spelter, Sheet Zinc and Sulphuric Acid.

ALL ORDERS FILLED PROMPTLY.

V. G. HUNDLEY,

PROPRIETOR OF

NORTH CAROLINA HANDLE CO.



MANUFACTURER OF

Handles and Spokes,

79 Reade Street and 97 Chambers Street, - - - - NEW YORK.

HARDWARE COMMISSION MERCHANT.

PHILADELPHIA.

Corrected Weekly by Lloyd, Supplee & Walton.)

Terms, 30 days. For 60 or 90 days, interest added at 10½ per cent. per annum.

Anvils.
Peter Wrights, ₩ lb....11 @ 11½c
Over 200 lbs....11½c
Trenton....10½
Eagle Anvils, American, 10c....dis 20 %

Apple Parers.
Globe Apple Pearers....$6 00 net
Penn Apple Parers....$6.00 net
Lots of 10 to 25 dozen special price
Bay State Peach Parer....$9 00

Axes.
Hunt's Kentucky and Yankee, per doz....$8.50 @ 9.00
Robert Mann....$8.00 @ 8.50
Richland Chief....$7 50 @ 8.00
Beveled Axes....add 50c net
Double Bit Axes....net....$14.50 @ 15.50

Augers and Auger Bits.—New List January 7, 1880.
Bates' Nut Augers....dis 45&10 %
Cook's Augers....dis 40&10 %
Watrous' Ship Augers....dis 15 %
Benjamin Pierce Auger Bits....dis 40 %
Griswold Auger Bits....dis 45&10 %
Cook's "....dis 40&10 %
Jennings' "....dis 10, 10&10 %
Bonney's Pat. Hol. Augers, list $48 ₩ doz..dis 25&10 %
Stearns' Pat. Hol. Augers, list $48 ₩ doz..dis 20&10 %

Balances.
Light and Common....dis 15&10 %

Bells.
Bevin Bros. Mfg. Co. Light Hand Bells....dis 70 %
Swiss Pattern Hand Bells....low list dis 40&10 %
Connell's Door Bells....dis 15 & 10
Gt. Western & Kentucky Cow new list....dis 60

Boring Machines
Upright, without Augers....List 5.50 } dis 45@50 %
Angular, without Augers...." 6.75 }

Bolts.—Eastern Carriage Bolts....dis 80 @ 80 & 10 %
Philadelphia "....new list dis 70&10 %
Stanley, Wrought Shutter....dis 50&10 %

Braces.—Barber's....dis 40&5 %
Backus....dis 50 %
Spofford....dis 50&5 %
American Ball....dis 55 %

Butts.—Cast Fast Joint, Narrow....dis 45&10 %
" " Broad....dis 45&10 %
Cast Loose Joint, Narrow....dis 55&10 %
" " Broad....dis 55&10 %
" Acorn. Loose Pin....dis 50&10 %
" " " Jap'd....dis 60&10 %
" Mayer's Loose Joint....dis 60&10 %
Wrought Loose Pin....dis 55&10 %
" Table Hinges and Back Flaps...dis 50&10 %
" Narrow. Fast....dis 50&10 %
" Loose Joint....dis 55&10 %

Blind Butts.
Parker....dis 70 & 2 %
Clark....dis 70 & 2 %
Shepard....dis 70 %
Lull & Porter....dis 70&10 %
Huffer's....dis 50 %

Chains.—German Halter and Coil. list December 31. 1881....dis 45@ 50 %
Galvanized Pump....₩ lb 9½c net
Best Proof Coil Chain—English.
₩ lb.... 13 10 8½ 7½ 7¼ 7 gold
3-16 ¼ 5-16 ⅜ 7-16 ½ in.

Chisels.—Socket Framing....dis 65&10 %
Socket Firmer....dis 65&10 %
Butcher's....$5.00 to £ gold

Casters.—Bed (new list July 1, 1880,)....dis 45@50 %
Plate....dis 45@50 %

Coffee Mills.—Box and Side, new list Jan. 1, 1880....dis 45 %
Enterprise....dis 25 %

Cutlery.—Walden Pocket....new list net
Penna. Knife Co....new list net
Landers, Frary & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.

Drawing Knives.
Hart Mfg. Co.'s....dis 65&10 %
Adjustable Handle....dis 20 %

Fry Pans.
Tinned....dis 45 %
₩ doz. $3.50 4.00 4.50 5.00 5.50 6.50 7.50 9.00 10.00
No.... 0 1 2 3 4 5 6 8
Burnished....dis 60, 10 & 5 %
₩ doz. $3.00 3.75 4.25 4.75 5.25 6.00 7.00 8.00 9.00
No.... 0 1 2 3 4 5 6 7 8

Files.
Nicholson....dis 50 %
Disston....dis 50 %
Butcher....

Fluting Machines.
Eagle—3½ in. roll....each, $2.15 } dis 25 %
" —5½ in. roll....2.85 }
Crown—4½ in. roll....3.50 }
" —6 in. roll....4.00 } dis 25 %
" —8 in. roll....6.50 }
Geneva Fluter....dis 25 %
Favorite com Fluter & Sad Iron....₩ doz $10.50 net

Hammers.
Yerkes & Plumb's, new list....dis 30 %
Maydole Hammers....dis 15 %
Howell A. E. Nail Hammers....per doz. net $3.75

Handles.
Disston Loop Handles Crosscut....33c pair net
Boynton Loop Handles Crosscut....33c pair net

Hatchets.
Yerkes & Plumb, new list....dis 30 %
Hunt....dis 25 %

Hinges.
Strap and T....dis 55 & 10 %

Horse Nails. Nos. 5 6 7 8 9 10
Globe....24 21 19 18 17 16 dis 12½ %
Vulcan....26 23 21 20 19 18 dis 12½ %
Ausable....30 27 25 24 23 22 dis 30&10 %
" Pol'ed and P't'd & Blued & P't'd..31 28 26 25 24 23 dis 30&10 %
Clinton....23 21 20 19 18 dis 40&10 %
" Polished & Pointed.24 22 21 20 19 dis 30&10 %

Hay and Straw Knives.
Lightning....per doz. net $18.00
Electric....18.00
Wadsworth....10.50
Walton Straw Knives....17.00

Locks and Knobs.
Branford....new list dis 45, 10& 2 % cash
Gaylord Cabinet....dis 25&2 % cash
American Padlocks....dis 30, 10&2 % cash
Scandinavian Padlocks....dis 50 %
₩ doz..$5.00 5.50 6.50 7.50 8.50 10.00 12.50 } dis 60 %
No.... 57 58 59 60 61 62 63 }
₩ doz....$18.00 26.00 33.00 } dis 60 %
No.... 64 65 66 }

Lanterns.
Buckeye....Large list net; small list net
Tubular....No. 0, $8.65; No. 1, $10.15 ₩ doz net
Guards, 35 cents extra per doz. net.

Lawn Mowers.—Pennsylvania.... } new list
Philadelphia.... } dis 30 %
Excelsior.... }

Lawn and Garden Pumps.
Holland Patent....List $5.00 dis 10 %

Mattocks.
Long and Short Cutter....new list....45 %
Pennsylvania Pattern....dis 4 %

Molasses Gates.
Enterprise Mfg Co's Measuring Faucets....dis 25 %
Stebbins' Gates....dis 70&10 %
Lincoln's "....dis 60&10 %
Landers, Frary & Clark's Petroleum....dis 20&10 %
Brass Liquor Cocks, new list Jan. 1 1880....dis 45 %
Cork Lined "....dis 70 %

Meat Cutters.
Dixon's....dis 25&5 %
Woodruff....dis 25&5 %
Stowe....dis 25&5 %
Hale's....new list, dis 50, 10&2 cash
American....dis 25 %
Stuffers....dis 25&5 %
Enterprise Stuffers....dis 25 %

Planes.—Sandusky Tool Co....dis 20 %
Ogontz....dis 25 %
Ohio & Auburn....dis 20 %
Bailey (S. R. & L. Co.)....dis 20&10 %

Plane Irons.—Ohio Tool Co....dis, 20 %
Butcher's....$5.00

Plumbs and Levels.
Stanley's Adjustable....dis 65&10 %
" Non-Adjustable....dis 65&10 %

Picks.—New list....40 %

Razor Strops.
Lamont Combination....per doz. $4.00
" "....1 gross lots $42.00
Imitation Emerson....per doz. 2.00

Rules.—Stanley Boxwood....dis 70 &10 %
Stanley Ivory....dis 55&10 %

Steelyards.—Hart's Pattern....dis 33⅓&10 %
₩ doz....$14.50 17.75 21 00 26.50 31 00 35.50
Lbs.... 50 100 150 200 250 300
American Pattern....dis 33⅓&10 %
₩ doz....$8.00 10.25 13.75 15.60 16.75 19.50
Lbs.... 50 100 150 200 250 300

Squares.
Steel and Iron...dis 50; full case. dis 50&10&2 for cash
Try Squares, Stanley....dis 50&10 %
Disston's Try Squares....dis 40 %

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened....₩ doz $9.00 }
Clipper No. 10, Bronzed Blade, Boxed and Sharpened....₩ doz $8.50 } 30
Clipper No. 5, Painted Red, Boxed and Sharpened....₩ doz $8.00 }

Saws.—Disston's Hand, Panel and Rip....dis 20 %
Disston's Circular....dis 30 %
Cross-Cut No. 2, Plain Tooth....dis 40%
" Patent Tooth....dis 40%
" Champion Tooth....dis 40%
Boynton's Lightning Cross Cut, new list....dis 40 %
" Lightning Buck Saws, cross bar...dis 40 %

Shovels and Spades.
Oliver Ames & Sons. new list....dis 15 %
Griffiths....dis 50&5 50&5
Rowland....dis 50&5 50&5

Sad Irons.—4 to 10 lbs....₩ lb 3¼c
Mrs. Potts' Patent....dis 35 %

Stone.
Washita Extra....₩ lb 28c net
" No. 1....18c
" No. 2....16c
" Slips....37c
" Axe....130 net
Hindostan Oil Stone No. 1....₩ lb 6c }
" Axe Stone....8c } dis 33⅓ %
Slips....10c }

Screws.
Flat Head Iron, new list Dec. 27....dis 50 & 10%
Flat Head Brass, new list Dec. 27....dis 50 & %
Round Head Brass, new list Dec. 27....dis. 40 & 10 %
Round Head Iron, new list Dec. 27....dis. 45 & 10 %

Spoons.
Plated....dis 30, 10 & 5 %
German Silver....dis 40 & 10 %
Britannia, Boardman's....dis 60 %
" Parker's....dis 60&10 %
Tinned....dis 10 %

Springs.—Torrey....dis 50 %
Gem No. 3 small Jap'd....$2.00 } dis 50 & 10 %
" No. 2 medium Jap'd....2.75 }
Coil No. 10, per gross net....$6.00
Other Standard Springs....dis 50&10 %
Warner Door Springs, per doz. net....1.75
Standard Spring Hinges—
Single No. 0, per doz. net....1 25
" No. 1. " "....1.40
Other Standard Spring Hinges....dis 25&10 %

Stocks and Dies.....dis 10&5 %

Stove Polish.—Gem....₩ gross. $4 50, dis 5 %
Dixon....6.00, dis 10%
Fire Fly....$3.00 gross net

Tacks.....dis 30&10 %
Shoe Nails—4-8, and over 8c.... } 10 %
" " 3½-8, and under 9c.... }
Double Pointed Tacks....dis 10&5 %

Traps.
Genuine Oneida—Newhouse....dis 15 %
Im. Oneida—Newhouse list, first qual dis 55&5 @ 60 %

Vises.—Solid Box Trenton new list....dis 35 %

Wrenches.—Agricultural....dis 70 %
Coes' Genuine....dis. 50&3 %
Coes' Mechanics'....dis. 50&10&3 %
" " Mall. Bar....dis 75 %

Wire.
Bright or Ann'd, No. 0 to 18....dis 52½ to 55 %
" " No. 19 to 26....dis 60 to 62½ %
" " No. 27 to 36....dis 65 to 67½ %
Coppered, 0 to 18....dis 47½ to 50 %
Tinned Broom Wire....dis 55 to 57½ %
Galvanized Barb Wire....9cts
Painted Barb Wire....8c
Galvanized No. 7 to 18....Market List, dis 42½ to 45 %

Wringers.
Peerless No. 2½....$42.00
" No. 2....45 00
Universal No. 2½....42.00
" No. 2....45.00
Novelty No. 2, for common tubs....42 00
" No. 3....48.00
Excelsior E, for stationary tubs....51 00
" F "....57 00
In lots of 1 doz. $3.00 doz. dis. from above price.

PITTSBURGH.

Merchant Iron.

TERMS.—Note or acceptance at 60 days, with current rate of exchange on New York, or a discount of 2 per cent. for cash, if remitted within 10 days from date of invoice.

For fluctuations and discounts on card rates see weekly Pittsburgh Trade Report.

The following are card rates.

Flat Bar.
1½ to 4 by ⅜ to 1 inch....2.5c
4¼ to 6 by ⅜ to 1 "....2.6c
1¾ to 6 by 1⅛ to 1½ "....2.9c
1¼ and 1⅜ by ⅜ to ¾ "....2.6c
1 and 1⅛ by ⅜ to ¾ "....2.7c
⅝, ¾ and ⅞ by ⅜ to ⅝ inch....2.9c

Rounds and Squares.
1 to 1⅞....2.5c | ⅝ to 9-10....2.7c
2 to 2⅝....2.7c | ½ to 7-16....2.9c
2¾ to 3¼....3.0c | ⅜....3.1c
3⅜ to 4....3.5c | 5-16....3.3c
4¼ to 5....4.0c | ¼....3.5c
¾ to ⅞....2.6c | 3-16....5.5c

Oval Iron.
⅞ to 1½....2.9c | ⅝....3.3c
⅝ to ¾....3.1c | ½....3.7c

Half Oval and Half Round.
⅞ to 1¼ inch....3.2c | ½ inch....4.0c
⅝ to ¾ "....3.7c | ⅜ "....5.5c

Horse Shoe.
⅜ to 1⅛ by 5-16 to ⅞ inch....3.5c

Wagon Box Iron.
¾ Inch. Nos. 13 and 14....3.7c
¾ " " 11 and 12....3.5c
⅝ " " 13 and 14....4.0c
⅝ " " 11 and 12....3.8c
½ " " 13 and 14....4.4c
½ " " 11 and 12....4.1c

Heavy Bands.
3½ to 6 by ¼ and 5-16 inch....2.7c
1⅞ to 3¼ by ¼ and 5-16 "....2.7c
1 to 1⅜ by ¼ and 5-16 "....2.8c
¾ to ⅞ by ¼ and 5-16 "....4.0c
⅝ and ½ by ¼ and 5-16 "....3.5c

Light Bands.
1½ to 6 by ⅛ to 3-16....3.0c
1½ to 6 by Nos. 11 and 12....3.1c
1 to 1⅜ by ⅛ to 3-16....3.1c
1 to 1⅜ by Nos. 11 and 12....3.2c
⅞ and 13-16 by ⅛ to 3-16....3.4c
⅞ and 13-16 by Nos. 11 and 12....3.5c
¾ and 11-16 by ⅛ to 3-16....3.7c
¾ and 11-16 by Nos. 11 and 12....3.8c
⅝ and 9-16 by ⅛ to 3 16....4.0c
⅝ and 9-16 by Nos. 11 and 12....4.1c
½ inch by ⅛ and 3-16....4.3c
½ inch by Nos. 11 and 12....4.4c

Hoop Iron.
1¼ to 4, Nos. 13, 14 and 15....3.3c
1¼ to 2, Nos. 16, 17 and 18....3.4c
1¼ to 2, No. 19....3.5c
1¼ to 2, No. 20....3.6c
1¼ to 2, No. 21....3.7c
1¼ to 2, No. 22....3.8c
15-16 1, and 1⅛, Nos. 13, 14 and 15....3.5c
15-16, 1, and 1⅛, Nos. 16, 17 and 18....3.6c
15-16, 1, and 1⅛, Nos. 19 and 20....3.7c
15-16, 1, and 1⅛, No. 21....3.8c
15-16, 1, and 1⅛, No. 22....3.9c
⅞, Nos. 13, 14 and 15....3.7c
⅞, Nos. 16, 17 and 18....3.8c
⅞, Nos. 19 and 20....3.9c
⅞, No. 21....4.0c
⅞, No. 22....4.1c
13-16 Nos. 13, 14 and 15....3.9c
13-16, Nos. 16, 17 and 18....4.0c
13-16, Nos. 19 and 20....4.1c
13-16, No. 21....4.2c
13-16, No. 22....4.3c
¾, Nos. 13, 14 and 15....4.0c
¾, Nos. 16, 17 and 18....4.1c
¾, Nos. 19 and 20....4.2c
¾, No. 21....4.3c
¾, No. 22....4.4c
11-16, Nos. 13, 14 and 15....4.2c
11-16, Nos. 16, 17 and 18....4.3c
11-16, Nos. 19 and 20....4.1c
11-16, No. 21....4.5c
11-16, No. 22....4.6c
⅝, Nos. 13, 14 and 15....4.4c
⅝, Nos. 16, 17 and 18....4.5c
⅝, Nos. 19 and 20....4.6c
⅝, No. 21....4.7c
⅝, No. 22....4.8c
⅝, No. 23....4.9c
9-16, Nos. 13, 14 and 15....4.6c
9-16, Nos. 16, 17 and 18....4.7c
9-16, Nos. 19 and 20....4.8c
9-16, No. 21....4.9c
9-16, No. 22....5.0c
9-16, No. 23....5.1c
½ inch, Nos. 13, 14 and 15....4.8c
½ " Nos. 16, 17 and 18....4.9c
½ " Nos. 19 and 20....5.1c
½ " No. 21....5.2c
½ " No. 22....5.3c
½ " No. 23....5.4c

The prices under Hoop Iron do not apply to Cotton Ties.

1-10c per lb. extra will be charged for each gauge lighter than the lightest indicated.

1-10c per lb. extra will be charged for cutting Hoops to specified lengths.

Barrel Hoops.
1¼ to 2 in., cut to length.
9 to 11 lbs, per set of 6 hoops....3.5c
8 lbs. and less than 9 lbs. per set of 6 hoops....3.6c
Less than lbs. per set of 6 hoops....3.8c

Extras for Cutting to Length all Preceding Iron.
All Iron, including Tire....1.10c

Tank Iron.
No. 9 and heavier....3.3c
Plow Slabs....3.5c
" Wings....3.8c

Sheet Iron.

	Common.	Charcoal.	Juniata.
No. 10 to 14	3.5c	5.0c	6.5c
No. 15 to 17	3.8c	5.3c	6.8c
No. 18 to 21	4.1c	5.6c	7.1c
No. 22 to 24	4.3c	5.8c	7.3c
No. 25 & 26	4.5c	6.0c	7.5c
No. 27	4.7c	6.2c	7.7c
No. 28	5.1c	6.6c	8.1c

All sheets No. 18 and lighter, over 30 inches wide, not less than 2.10c extra.

Wood's Patent Planished Sheet.
1st quality (A)....10½c | 2d quality (B)....9 c

Galvanized C. H. B.—(Charcoal Hammered Blooms.
Nos. 14 to 20....12c | No. 27....15c
Nos. 21 to 24....13c | No. 28....16c
Nos. 25 and 26....14c | No. 29....18c
42½ @ 45 % discount.

Coal Screen Iron.
1¾ by ⅝ by 5-16....3.0c | 1 by ⅝ by 5 16....3.5c

Angle Iron.
2½, 3, 3½ and inch....3.3c
1½, 1¾ 2 and 2¼ inch....3.3c
1¼ inch....3.4c
1 "....3.6c
1½ by 1 inch, for Plow Handles....3.8c
1½ by ⅜....3.8c
1⅜ by ⅜....3.9c

T Rail.
8 lbs. to the yard....2.9c | 20 lbs. to the yard....2.8c
12 "....2.6c | 28....2.8c
16 "....2.8c | 30....2.8c

Splice Joints for 12, 16 and 20-lb. Rail, 40c each; 28 and 30 lb. Rail, 50c each: 40 lb., 60c each.
3½ by ⅜ and ½ Spikes for 20 and 28-lb. Rail....4½c
2½ and 3 by ⅜ " " 12 and 16-lb. "....4¾c
2½ by 5 16 " " 8-lb. Rail....5¼c

Flat Rails.—Punched and Countersunk.
1½ to 2 by ½ to ⅝ inch....3.0c
1½ by ⅜ and 7-16 inch....3.2c
1¼ by ⅜, 7-16 and ½ inch....3.5c

Juniata Nail Rods....6.5c
Norway "....8.0c
Guard Iron ¼x⅜x⅝ and ⅛x⅝x⅝....4.0c
" ⅜x⅝x9 16 and ⅜x⅝x½....4.2c
Drag Bars....3.3c
Dropper Bars....3.8c
Cylinder and Landside Iron....3.2c
Plow Beam Iron....3.00

Nails.
See Pittsburgh Trade Report.

Best Quality Refined Cast Steel.

Square, Flat, Octagon and Round.
⅜ to 2 inches, inclusive....11c
1-16 and 2⅛ to 3 inches....12c
¼ and 3⅛ to 4 "....13c
7-32 and 4⅛ to 5 "....14c
3-16 and 5⅛ to 6 "....17c
5-32 inch....22c
⅛ inch....30c
Oil Well Steel Forgings....20c

Machinery Steel.

	Crucible.	Bessemer & Open Hearth
Ordinary Sizes, ⅜ to 2 inch Round	7c	6c
5-16 and 2⅛ to 3 inches	8c	6c
¼ and 3⅛ to 6 "	9c	7c
7-32 inch	11c	8c
3-16 "	12c	10c

Square, Flat and Octagon, ½c extra throughout the list.
Cut to specified lengths, ½c extra

Hammer Cast Steel.
Crucible Cast Steel....8½c
Open Hearth Cast Steel....7c

Sheet Steel.—Crucible.

	Best.	2d Qual.	3d Qual.	Bessemer & Open Hearth.
To 21 gauge	12c	11c	9c	7c

1c. extra for each additional gauge.
Cut to multiples or specified lengths, ½c. extra.

Miscellaneous Cast Steel.
Auger and Auger Bit....8½c
Axle Steel for carriages and wagons....8½c
Frog Points and Plates....10c
" Side Bars....8½c
Pick, plain (hammered)....10c
" and Mattock, beveled (rolled)....8½c
Skate Steel....09
Table Cutlery, plain....7c
Table Cutlery, beveled....7½c
Pike and Cant Hook....8½c
Coal and Granite Wedge....8½c
Roller....8½c
Spindle, subject to Machinery classification....8½c
Trap Spring Steel....10c
Forged Crank Pins and Lathe Spindles....11c
Piston Rods, plain....8½c
" forged to shapes....11c
Slide Bars, plain....8½c
forged to shapes....11c

Crucible, Open Hearth or Bessemer
Boiler, Fire-Box and Flue Sheets, not less than 3-16 thick....6½c
Boiler, Fire-Box and Flue Sheets, not less than ⅛ thick....7½c
Circulars and semi-circulars, when ordered separately....8c
Smoke Stack, to shape....8c
Locomotive Tank Steel....7

File Cast Steel.
Square, Round, Half Round and Flat Bastard, 8 inch and over....8c
Mill Saw, 8-inch and over....8½c
Taper, 3½-inch and over....9½c
Horse and Shoe Rasp....8½c

Spring Cast Steel....6½c
Spiral and Taper, cut to lengths....7c

Tire Cast Steel.
1x½ and over....8½c
1x3-16, ⅞x3-16 and ⅛....9c
1 and 13-16x⅛ and 5-32, ¾x3-16 and 5-32....9½c
¾ and ⅝x⅛ and 3-32 and 12 g....11c
Solid Safe Cast Steel....7½c
Three and Five Ply Cast Steel....10c

Agricultural Implement Cast Steel.
Fork and Rake, Crucible....8c
Horse Rake Steel, cut to lengths, Crucible....8c
Hoe, Crucible....7½c
Corn Stalk Cutter, beveled....9½c
Beveled Hoe and Shovel Steel in Bars....8½c
Crucible Plow Steel in slabs....6½c

Bessemer and Open Hearth.
Spring....4½c
" spiral and taper, cut to lengths....5½c
Tire, 3-16 thick and above....4½c
Toe Calk....4½c
Plow....4½c
Axle Billets....4c
Sleigh Shoe....4c
Cutter Shoe, cut to lengths and tapered....5½c
Scythe Back Steel....4c
Grain Drill Bars....7½c
" Points....8½c
Rolling Coulter Blanks, cut and punched....9½c
Thrasher Steel....4½c
" Teeth....5½c
Rolled Hammer Billets....4½c

Terms.—Four months: 2 per cent. discount for cash, if remitted within 30 days.

Rolls and Castings.
Furnace Floor and Straightening Plates....2 c
Housings and Castings not otherwise specified....3 c
Guide Plates....3½c
Spindles and coupling boxes....3 c
Sand Rolls and Pinions, large size....3 c
" small size....3½c
Pipe Mill Castings....5 c
Rolling Mill Castings under 50 lbs....4 c
Spur and Bevel Wheels, large....3 c
" " small....4½c
Pulleys up to 30 inches....3½c
over 30 inches....4 c
Engine Castings, light....4½c
" " heavy....4 c

Chilled Rolls.
6 to in. diam., to 20 in. long....5c
8 to 15 in. " 8 to 40 in. "....4½c
25 to 24 in. " 15 to 72 in. "....4¼c
14 to 31 in. 72 to 108 in. "....4¼c

After Oct. 1, 1881, no discounts will be made at settlement as heretofore, prices quoted being net.

White and Red Lead.
Strictly Pure White Lead in Oil, in kegs 6¼c.; in 25 lb Tin Pails, ¼c. ₩ lb over keg price; 12½ lb tin Pails, 1c ₩ lb over keg price; assorted, 1 to 5 lb cans, 3c. per lb over keg price.
Dry White Lead in barrels....5¾c
Red Lead, very brilliant, in kegs, 6½c; in barrels 6¼c
Litharge (Potter's Lead) " 6½c; " 6¼c
Freights equalized with all points where White Lead is made.
Terms: Note at sixty days, or if paid within 15 days from date of invoice a discount of 2½ per cent. will be allowed, but not otherwise.

Window Glass.
Discount, 70 % on Single Strength, 70 & 10 % on Double.

Single Strength. Size.	AA.	A.	B.	C.
5 x 8 to 10 x 15	$8.25	$7.50	$7.00	$6.50
11 x 14 to 16 x 24	9.25	8.50	8.00	7.25
18 x 22 to 20 x 30	10.75	9.75	8.75	7.75
15 x 36 to 24 x 30	12.25	10.75	9.00	8.60
26 x 28 to 24 x 36	13.00	11.50	9.75	9.00
26 x 36 to 26 x 44	14.50	13.25	10.75	9.50
26 x 46 to 30 x 50	15.00	14.00	11.25	10.50
30 x 52 to 30 x 54	16.00	14 50	12.00	
30 x 56 to 34 x 56	17.25	15.60	13.50	
34 x 58 to 34 x 60	18.25	17.25	15.00	
36 x 60 to 40 x 60	20.75	18.75	17.25	
Double Strength.				
6 x 8 to 10 x 15	12.75	11.75	10.75	10.00
11 x 14 to 16 x 24	14.50	13.25	12.50	11.25
18 x 22 to 20 x 30	17.25	15.75	14.00	
15 x 36 to 24 x 30	19.75	17.25	14.50	
26 x 28 to 24 x 36	21.00	18.50	15.75	
26 x 36 to 20 x 44	23.25	21.25	17.25	
26 x 46 to 30 x 50	24.00	22.50	18.00	
30 x 52 to 30 x 54	25.75	23.25	19.25	
30 x 50 to 34 x 56	27.75	25.00	21.75	
34 x 58 to 34 x 60	29.25	27.75	24.00	
36 x 60 to 40 x 60	33.25	30.00	27.75	

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 52 inches in length and not making more than 81 united inches, will be charged in the 84 united inches bracket.

Hubbard, Bakewell & Co.'s Goods.
Axes, Single Bit, Lippincott....Per doz. $8.00
" " James & Co...." 7.00
" Double Bit, Lippincott...." 15.00
" " James & Co...." 12.00
Drain Tools, list....dis 20%
Hoes, Planters'....dis 55%
" Scovill Pattern....dis 55%
" Handled, Square Eye, German....dis 25%
Handles, Cross Cut....Per doz. $3.50
" Shovel, Bent, Bored, Riveted...." 2.50
Saws, Circular....dis 45%
" Long....dis 40%
" Cross Cut, H. B. & Co., Champion, Per ft. net....$0.35
" Cross Cut, Lippincott, Champion, Per ft. net....30
Shovels, list....dis 20%
Spades, "....dis 20%
Scoops, "....dis 20%

BOSTON.

Reported by Macomber, Bigelow & Dowse.

Anvil & Vise.—
No. 1, $5.25; 2, 4.25; 3, 3.50 each.....dis 25 %

Augurs & Bitts.—Snell's Auger.....dis 40&10 %
L'Hommedieu's Ship Auger.....dis 15 %
Jenning's Bitts.....dis 10&10&10 %
Cook's Bitts.....dis 40&10 %
Shepardson's Double-Cut Bitts.....dis 45 %
Shepardson's Double Gimlets.....dis 40 %
Stearn's Extension Hollow Augers—
No. 2, ₱ doz., $48.00; No. 3, ₱ doz., $60.00 list..dis 20 %
Bonney's Extension Hollow Augers.....₱ doz $36.00
Pierce's Bitts.....dis 50 %
Griswold Bitts.....dis 60 %

Axes.—Blue Jackets.....₱ doz $9.00
Red Cross.....₱ doz 8.00
Red Cross Handled.....₱ doz 12.00
Dowse Handled Boys'.....dis 33⅓ %

Ax Handles.—
Oak Extra, 31 in., No. A.....₱ doz $2.50
Oak Extra, 34 in., No. A.....₱ doz 2.50
Oak Extra, 31 in., No. B.....₱ doz 2.00
Oak Extra, 34 in., No. B.....₱ doz 2.00
Oak Extra, 31 or 34 in., No. C.....₱ doz 1.40

Axle Clips......dis 50 %
Balances.—Chatillon's.....dis 33⅓ %

Barn Door Rail.—
Cast Angle (for Anti-Friction Hangers').....7 ft. 2c
Cast Half Round.....₱ ft., ⅝, 30; ¾, 40
Wrought Round.....₱ ft., ⅝, 30; ¾, 40; ⅞, 60

Bells.—Connel's Crank Gong, reduced list..dis 15&10 %

Bird Cages.—
Japanned M. B. & D., reduced list, 1879.....dis 40 %
Brass M. B. & D., reduced list. '79.....dis 33⅓ %

Blind Fasts.—Lock Fasts.....₱ C sets $5.00
No. 6 Fasts.....₱ C sets 6.00
Veazie Fasts.....₱ C sets 6.00
Shedd's.....₱ C sets 7.00
Blind Hinges.—Mall, Hook, 3 holes.....₱ C sets 7.00

Brad Awl Handles.—
Phœnix Adjustable.....₱ doz $2.00

Bolts.—Norway Iron Carriage.....dis 75 %
Common Iron Carriage.....dis 80 & 10 %

Borax.—Refined.....₱ lb 15c

Boring Machines.—
Eagle Upright each.....$5.50 list } dis 40&10 %
Eagle Angle each.....6.75 list }
Snell Augers.....₱ set $2.45

Braces.—Barber's.....dis 40&5 %
Spofford's.....dis 10&5 %
Backus'.....dis 50&5%

Bracket Saws.—Holly Scroll Saw.....each $2.25
Demas Lathe and Scroll Saw.....each 6.50
Bracket Saws, extra quality, to No. 5.....₱ gro 0.75
Steel Frame, with patterns.....₱ doz 6.50
Lester.....dis 20 %
New Rogers, all iron.....dis 25 %

Bracket Saw Blades.—Griffith's pat.....₱ gross 7.50

Brackets.—
H. B. & M. Flower Pot, reduced list.....dis 15&10 %
Bronzed Shelf, M. B. & D., new list.....dis 50 %
Store Shelf.....dis 40 %

Butts.—Union Fast Joint.....45&10 %
Union Loose Joint.....dis 55&10 %
Union Japanned Acorn.....dis 55&10 %
Union Silvered Acorn.....dis 55&10 %
Union Boston Finish.....dis 70&10 %
Union Spiral Spring.....dis 35&10 %
Wrought Brass.....dis 65& 10%

Carriage Bolts.—Eagle Norway.....dis 70&10 %
Common.....dis 80 & 5 %

Carriage Jacks.—Climax No. 1.....₱ doz $26.00
Climax No. 1½.....₱ doz 15.00
Climax No 2.....₱ doz 15.00
Universal.....dis 25 %
Universal No. 1.....each, $2.00
Universal No. 2.....each 3.00
Universal No. 3.....each 5.00
Universal No. 4.....each 6.00
Universal No. 4.....each 6.50

Cartridges.—U. S. Cartridge Co.....dis 75 %

Cards.—
Watson's make Horse & Curry.....dis 10 %
Watson's Cotton.....dis 10 % } New List, July, 1881.
Watson's Wool.....dis 10 %

Casters.—Bed and Table.....dis 50 %

Chain.—Traces 6½, 10, 4, straight.....₱ pair 40c
Traces 6½, 10, 4, twisted.....₱ pair 55c
Traces 7, 12, 2, twisted.....₱ pair 80c
Coil 3-16.....₱ lb 10½c
Coil ¼.....₱ lb 8½c
Coil 5-16.....₱ lb 7c
Coil ⅜.....₱ lb 6½c
Coil 7-16.....₱ lb 6c
Coil ½.....₱ lb 5½c

Chalk.—White, Carpenter's.....₱ gross 50c
Red, Carpenter's.....₱ gross 80c
Blue, Carpenter's.....₱ gross $1.00

Chisels.—Hart, Bilven & Mead, Framing..dis 60&10&10%
Underhill, Framing.....dis 25 %
Buck's Chisels.....dis 30 %

Clothes Line.—
Galvanized Wire, 100 feet each.....₱ doz $4.00

Coal Hods.—"Dover."—Galvanized, New List..dis 60%
Japanned, new list.....dis 60 %

Coffee Mills.—New List.....dis 45 %

Copper Rivets......dis 40 %

Cow Ties......dis 33⅓ %
No. 30, 3 ft. No. 6 Wire, with toggle.....₱ doz $3.80
No. 34, 3 ft. No. 6 Wire, with snap.....₱ doz 4.00
No. 40, 3½ feet No. 6 Wire, with toggle.....₱ doz 4.50
No. 45, 3½ ft. No. 6 Wire, with snap.....₱ doz 4.50
No. 40, 4 ft. No. 4 Wire, with toggle.....₱ doz 4.75
No. 45, 4 ft. No. 4 Wire, with snap.....₱ doz 4.00
No. 60, 4½ ft. No. 3 Wire, with toggle.....₱ doz 5.00
No. 65, 4½ ft. No. 3 Wire, with snap.....₱ doz 5.80

Cocks.—Brass. L. F. & Co.....dis 40&10 %

Cordage.—Manila, usual trade dis 1c.....₱ lb 15½c
Jute.....₱ lb 9c

Crow Bars.—Cast Steel.....₱ lb 7½c
Iron Steel-pointed.....₱ lb 6c

Cutlery.—Pocket American Shear Co.'s.....dis 40 %
Butcher Knives Wood's, Lap Bolster, Square Handle.....dis 30 %
Steak Knives.....dis 25 %
Lap Bolster, Oval Handle.....dis 20 %
Sticking.....dis 20 %
Skinning.....dis 30 %
Butcher, Common Round Handle, Wood's.....dis 20 %
Shoe Knives, Wood's.....dis 20 %

Dividers.—Cook's.....dis 25 %

Dog Collars......dis 20 %

Door Springs.—Torrey's Rod.....₱ doz $1.62
Imitation Torrey's Rod.....₱ doz 1.40
Gem Coil, new list.....dis 50 & 10 %
Crown.....₱ doz 1.25
Warner's.....₱ doz 2.00

Door Stops.—Thurston's.....dis 50 %

Drawer Knobs.—Thurston's.....dis 50 %

Drills.—Morse Bitt Stock.....dis 25 %
Morse Straight Shank.....dis 20 %

Emery.—Wellington Mills.....₱ lb 10c
Walpole Emery Mills.....₱ lb 9c
Turkish in 10 lb cans.....₱ lb 8c

Enameled Ware.—
Standard Mfg. Co. Kettles.....dis 40 & 10 %
Standard Sauce Pans.....dis 30 %

Felloe Plates.—Wrought.....₱ lb

Files.—American File Co.....dis 50 %
Nicholson File Co.....dis 50 %

Fluting Machines.—Knox list, $4.00.....dis 20 %
American list, $3.40.....dis 20 %

Forks.—W. C. & Co. Manure.....dis 50 %

Gimlet Bits.—
Genuine German, No. 12s, 1-32 to 8-32, per doz $1.00
Pierce's.....per doz .88

Glass Cutters.—Combination Glass Cutter and Knife Sharpener.....₱ doz $1.00

Grub Hoes.—K. P. & Co.'s No. 2, $11.50 ₱ doz..dis 50 %

Hammers.—Maydole's.....dis 15 %
Eartford Hammer Co.....dis 20 %

Hangers & Rollers.—Anti-Friction.....dis 50 %
Acme Rollers.....dis 50 %
Climax.....dis 50 %
Common Hangers.....dis 50 %
Common Rollers.....dis 5 %

Hand Screws......dis 10 %

Hatchets.—C. F. Dowse new list.....dis 33⅓ %
Underhill.....dis 30 %

Hay Knives.—Lightning.....₱ doz. $18.00, net
Fisher's Patent.....₱ doz $14.00

Hinges.—Strap and T (new list).....dis 60 %
Providence Plate.....₱ lb 6 %
Wrought Screw Hook.....₱ lb 6 %

Hoes.—W. C. & Co.'s.....dis 60

Hooks and Staples.—Brewers' (new list).....dis 60

Horse Nails......

No.	6	7	8	9	
National Finished	.23	.21	.20	.19	dis 20 %
Putnam Pointed	.24	.22	.21	.20	dis 5 %
Bridgewater	.21	.19	.18	.17	list

Ice Cream Freezers.—Packer's, new list.....dis 50 %

Knobs.—"Norwalk." New list.....dis 45 %
Silver Glass.....dis 50&10 %
Silver Glass Bell Pulls.....dis 50&10 %

Lanterns.—Tubulars, No. 0.....₱ doz 8.00
Railroad, Oil, No. 43.....₱ doz 9.00
Triangular.....₱ doz 4.00

Lawn Mowers.—The "Daisy."
12 in. cut.....each, $8.00
14 in. cut.....each 8.50
16 in. cut.....each 9.00
18 in. cut.....each, 9.50

Lead.—Sheet.....₱ lb 7½c
Pipe.....₱ lb 6½c

Locks.—Norwalk.....dis 45 %
Eagle Cabinet.....dis 25 %
Eagle Trunk.....dis 15 %
W. Wilcox & Co., Padlocks.....dis 50 %

Manure Forks.—W. C. & Co.....dis 60 %

Mattocks.—
K. P. & Co., Long Cutter, $16.00 ₱ doz.....dis 40 %
K. P. & Co., Short Cutter, $15.50 ₱ doz.....dis 40 %
K. P. & Co., Pick Cutter, $16.00 ₱ doz.....dis 50 %

Measuring Tapes.—Eddy's.....dis 20 %

Meat Cutters.—Miles' Challenge.....dis 30 %
Hale's, (new list).....dis 40 & 10 %
American.....dis 25 %

Money Drawers.—Tucker'ar's Am.....₱ doz $22.50

Mouse Traps.—Delusion.....₱ doz 1.50
Novelty.....₱ doz

Nails......₱ keg 3.50

Oilers.—Zinc and Tin.....dis 60 %
Brass and Copper.....dis 50 %

Ox Bows.—Extra finished and varnished.....dis 10 %
1¼ in., ₱ doz. pair...$7.00 | 2 in., ₱ doz. pair. $10.00
1¾ in., ₱ doz. pair... 9.00 | 2½ in., ₱ doz. pair . 12 00

Paper.—Tarred Sheathing.....₱ lb 2½c
Tarred Eagle Brand.....₱ lb 2½c

Picks.—K. P. & Co., Adze Eye, 5 to 6 lb $12.00.....dis 50 %
K. P. & Co., Adze Eye, 6 to 7 lb $13.00.....dis 50 %

Planes.—
Fancy Planes.....dis 15 %
Razee Planes.....dis 20 %
N. Y. Tool Co.....dis 25 %
English Iron.....dis 20 %
Bailey's.....dis 20&10 %

Plated Ware.—Rogers & Bro.....dis 40&5 %

Pliers.—Vom Cleff & Co.'s.....net list
Button's Wire Pliers.....dis 33⅓ %

Plumb & Levels.—Stanley R. & L. Co.....dis 60&10 %

Pocket Knives.—American Shear Co.'s.....dis 40 %

Potato Diggers.—W. C. & Co., reduced list..dis 60 %

Pulleys.—Acme or Excelsior, 1¾ in.....₱ doz 24c
Acme or Excelsior, 2 in.....₱ doz 27c

Pulley Blocks......dis 35 %

Pumps.—Union Manufacturing Co.
Iron Cistern.....dis 40 %
Iron Pitcher Spout.....dis 60 %
Copper.....dis 30 %

Rivets.—Black (new list).....dis 40 %
Carriage in 10 lb papers (new list).....dis 40 %
Copper.....dis 33⅓ %

Razors.—Torrey's.....dis 20 %

Razor Strops.—Torrey's.....Full line

Rules.—Stanley, Boxwood.....dis 70 &10 %
Stanley, Ivory.....dis 50&10 %

Sad Irons.—Common.....₱ lb 3½c
Laundry.....₱ lb 6½c
Tailors' Geese.....₱ lb 6 c
Enterprise, "Potts'".....dis 35 %

Sash Locks.—King & Hutchinson's, new list..dis 40 %

Sandpaper.—Baeder & Adamson.....dis 30 %
M. B. & D.....dis 15 %

Sash Weights.—Patent Eye.....₱ lb 1½c

Saws.—Hand Saws, Disston's.....dis 20 %
Wheeler & Clemson.....dis 20 %
Cross-Cut Saws.
W. M. & Co., Common Tooth, No. 1.....₱ foot 35c
W. M. & Co., Champion Tooth.....₱ foot 35c
Disston's, Common Tooth.....₱ foot 66c dis 40 %
Disston's Great American Tooth...₱ foot 66c dis 40 %
Boynton's Light Ing Tooth.....₱ foot 45c
M. B. & D., Hand Saws.....dis 33⅓ %
W. M. & Co.'s Circular Saws.....dis 35 %
Richardson Bros.....dis 25 %

Saw Blades.—Disston.....dis 20 %
W. M. & C.....dis 10 %
Welch & Griffith, Extra.....₱ doz $8.40
Welch & Griffith, No. 2.....₱ doz 7.00

Scales.—Fairbanks.....dis 20 %

Screws.—Aiken's Flat-Head Iron new list..dis 50 & 10 %
American Flat-Head Iron.....new list, dis 50 & 10 %
American Flat-Head Brass.....new list, dis 50 & 10 %
American Round-Head Brass.....new list, dis 40 & 10 %
American Round-Head Iron.....new list, dis 45 & 10 %
Grilley Round Head Nickel-Plated Common..dis 40 %

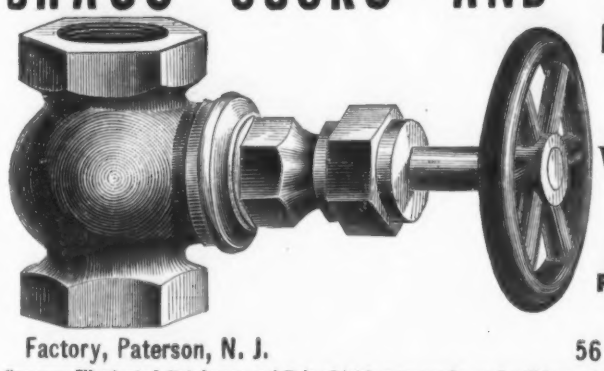
Scythes.—Clippers, in boxes.....₱ doz $6.75
Shaves.—Kimball's.....₱ inch 75c
Watrous.....dis 15 %
Shears.—American shear Co., new list.....dis 20 %
Shot.—Tatham's.....₱ lb 7c
Shovels.—O. Ames, new list.....dis 15 %
O. Ames, other brands, new list.....dis 15 %
M. B. & D.....dis 15 %
Sinks.—Magee Patent.....dis 30 %
Snow Shovels......$4.00
Skates.—Union.....dis 25 %
Acme.....dis 25 %
Imperial Club list No. 5, $5.75 ₱ pair; list No. 7, $8.00 ₱ pair.....dis 25%
Stocks and Dies.—King's.....dis 10&5 %

Tacks.
Swedes Tinned.....dis 30&10 %
Swedes Iron.....dis 30 & 10 %
Gimp and Lace.....dis 20 & 10 %
Copper Tacks.....dis 30 & 10 %
All balances on list.....dis 20&10 %
Traps.—Oneida, Genuine.....dis 33⅓ %
Oneida, Imitation, H. & N.....dis 50 %
Blake's.....dis 40&10 %
Vises.—Simpson's Adjustable.....dis 25&5 %
Howard Vise Co.....dis 25 %
Prentiss'.....dis 20 %
Weather Strips.—Packer's.....₱ doz $4.50
Browne's Flexible Rubber.....dis 30 %
In 25 feet boxes: No. 1, ⅜ in. wide, ₱ yard, 10c.; No. 2, ⅝ in., 15c.; No. 3, ¾ in., 20c.; No. 4, 1 in.....25c
Black Walnut Spring Weather Strips.....₱ doz $3.50
Window Springs.....dis 33⅓ %
Babcock's No. 3.....₱ gross $6.25
Babcock's No. 4.....₱ gross 4.15
Wire Cloth.—"Clinton".....₱ ft
Wire Fence.—Scutt's Patent, Painted.....₱ lb 7½c
Scutt's Patent, Galvanized.....₱ lb 8½c
Wire Goods.—Gate Hooks and Eyes, &c., dis 50&10 %
Wrenches.—A. G. Coe's.....dis 50 %
Girard Mfg. Co.....dis 50 & 10 %
Girard Agl.....dis 60 & 10 %
Wringers.—
Novelty No 2 for Common Tubs.....₱ doz 42.00
Novelty " 3 " " " " .....₱ doz 48.00
Excelsior E " Stationary Tubs.....₱ doz 51.00
Excelsior F " " " " .....₱ doz 57.00
Excelsior A with Folding Bench.....₱ doz 59.00
Excelsior B " " " " .....₱ doz 64.00
$4.00 per doz dis if ordered in not less than 1 doz lots, and $5 per doz dis if ordered in not less than 4 doz lots.
Novelty Set Tub, E.....₱ doz 50.00
Keystone, Wood Frame No 1¾.....₱ doz 30.00
Keystone, Iron Frame No 2¼.....₱ doz 37.00
Zinc.....₱ lb 6½c

McNab & Harlin Mfg. Co.,

MANUFACTURERS OF

BRASS COCKS AND VALVES,



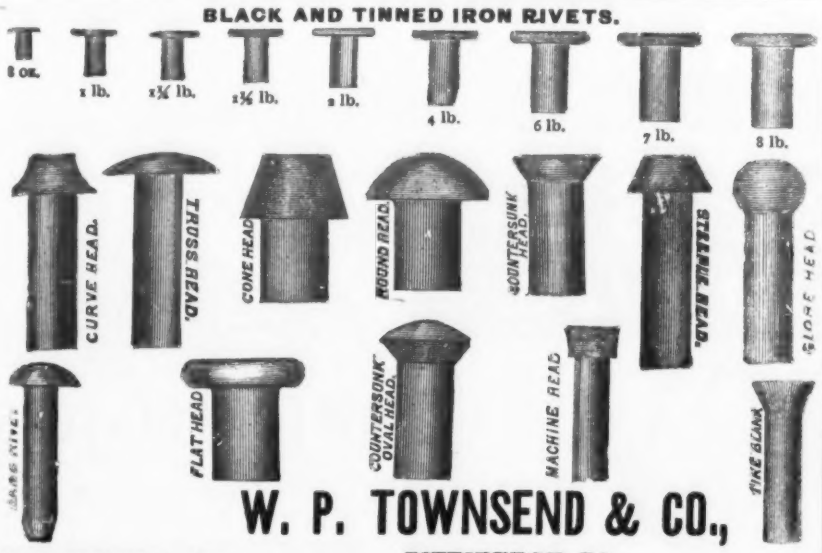
For STEAM, WATER, and GAS. Wrought Iron Pipe and Fittings,

PLUMBERS' MATERIALS.

Factory, Paterson, N. J. 56 John Street, N. Y.

Our new Illustrated Catalogue and Price List is now ready, and will be sent to the trade with their first order, or by express, if desired, before ordering.

BLACK AND TINNED IRON RIVETS.



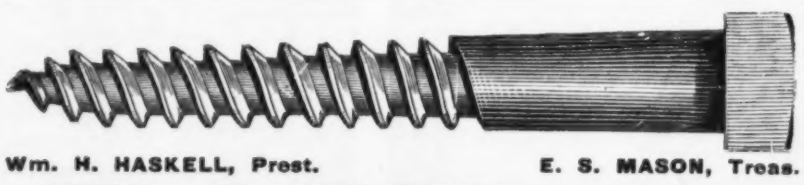
W. P. TOWNSEND & CO.,

PITTSBURGH, PA.,

Manufacturers of every description of First Quality

RIVETS.

H. B. NEWHALL CO., 105 Chambers St., New York Agents.



Wm. H. HASKELL, Prest. E. S. MASON, Treas.

WM. H. HASKELL CO.,

Pawtucket, R. I.

MANUFACTURERS OF

COACH SCREWS,

(With Gimlet Points,)

ALL KINDS OF

Machine and Plow Bolts,

AND

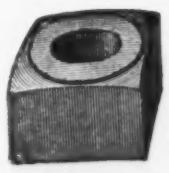
TAP BOLTS.

HENRY B. NEWHALL CO., 105 Chambers St., New York, and 47 Pearl St., Boston, (J. H. WORK, Manager), EASTERN AGENTS.

STANDARD NUT CO.,

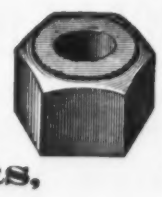
Pittsburgh, Pa.,

MANUFACTURERS OF



HOT PRESSED

Square & Hexagon Nuts,



R. R. FISH BARS,

BOLTS,

SPIKES.

RIVETS, &c.

HENRY B. NEWHALL CO, 105 Chambers St., New York, and 47 Pearl St., Boston, (J. H. WORK, Manager), EASTERN AGENTS.

Philadelphia "STAR" Bolt Works.

NORWAY IRON FANCY HEAD BOLTS,

Carriage & Tire Bolts. Star Axle Clips, &c.

TOWNSEND, WILSON & HUBBARD, 2301 Cherry Street, Philadelphia, Pa.

G. W. Bradley's Edge Tools.

Butchers' Cleavers.
Butchers' Choppers,
Axes and Hatchets,
Grub Hoes and Mattocks,
Mill Picks,
Box Chisels and Scrapers,
Ring Bush Hooks,
Ax Eye Bush Hooks,
Socket Bush Hooks,
Watt's Ship Carpenters' Tools,
Carpenters' Drawing Knives,
Coopers' and Turpentine Tools.

FOR SALE BY

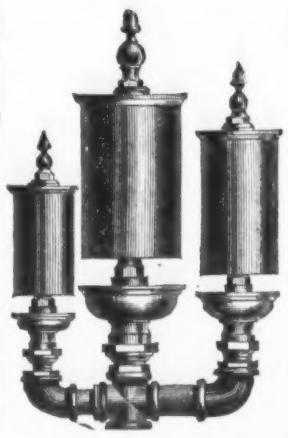
MARTIN DOSCHER, Agent, 85 Chambers Street, N. Y.

BRONZE BEARINGS.

AMERICAN BRONZE WORKS.
BRONZE AND BRASS BEARINGS AND ORNAMENTAL CASTINGS.
CAR AND LOCOMOTIVE WORK A SPECIALTY.

23 Columbus Street. Cleveland, O.

WHISTLE CHIMES TO ORDER.



EATON, COLE & BURNHAM CO.,

58 John St., NEW YORK. Factory at BRIDGEPORT, CT.

MANUFACTURERS OF

Fittings, Valves, Tools,

AND ALL STYLES OF

Goods for Steam, Water, and Gas, Wrought Iron Pipe, &c.

Agents for BUNDY'S RADIATORS.

Manufacturers of

DEANE'S PATENT SOLID STOCKS AND DIES.

LIGHTNING HAY KNIVES.

WEYMOUTH'S PATENT.

This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and is giving *universal* satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for exports as well as home trade, and it *seems destined* to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each of 50 pounds weight, suitable for shipping by land or water to any part of the world.

MANUFACTURED ONLY BY

HIRAM HOLT & CO.,

East Wilton, Franklin Co., Maine.

For sale by the Hardware Trade generally.

Ludlow Valve Mfg. Co.

OFFICE AND WORKS:

938 to 954 River St. & 67 to 83 Vail Ave., Troy, N. Y.

VALVES.

Double and Single Gate, ½ in. to 48 in.—outside and inside Screws, Indicator, &c. for Gas, Water and Steam. Send for Circular.

Also FIRE HYDRANTS.

HARCOURT PATENT.

IMPROVED SNATCH BLOCK.

BAGNALL & LOUD,

BOSTON, MASS.

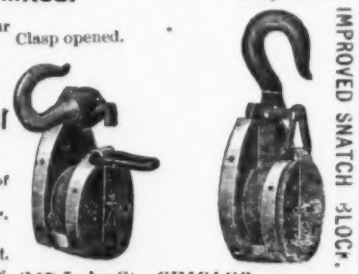
Sole Manufacturers in U. S. A. of our Celebrated

METALINE

AND

Improved Sleeve Roller Bush Tackle Blocks.

Clasp closed. Clasp opened.



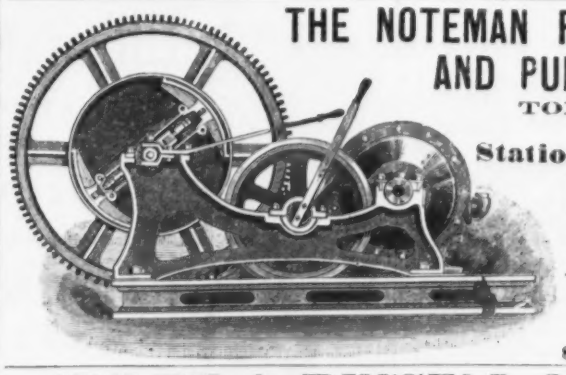
Also a full line of every variety of TACKLE BLOCKS.

Try Us with a Sample Order.

Send for Illustrated Catalogue.

New York Warehouse, 33 South Street.

Western Agency: GURNEY & PHALEN, 247 Lake St., CHICAGO.



THE NOTEMAN ROTARY ENGINE AND PUMP CO.

TOLEDO, OHIO.

MANUFACTURE

Stationary & Hoisting

ENGINES

High Speed Engines.

H. H. BALCH,

86 John St., New York.

WILEY & RUSSELL MFG. CO.,

THE GREEN RIVER TIRE UPSETTER.

GREENFIELD, MASS.,

LIGHTNING SCREW-CUTTING MACHINERY AND TOOLS,

BOLT CUTTERS,

Both for Hand and Power Use, in great Variety.

THE CELEBRATED LIGHTNING SCREW PLATES,

Green River Upright Drilling Machines, Thoroughly Made and of the Best Patterns.

Punching Presses, Tire Upsetters, Tire Benders, Measuring Wheels, Fire Taps and Dies, Reamers, Countersinks and various other Labor-Saving Tools.

Send for Illustrated Price List.

J. E. QUACKENBUSH & SON

MANUFACTURERS OF

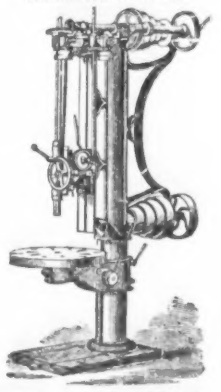
Porcelain, Mineral & Jet Knobs & Escutcheons.

Send for Price List and Terms. OFFICE, 535 8th Ave., N. Y.

P. BLAISDELL & CO.,

WORCESTER, MASS.

Manufacturers of the

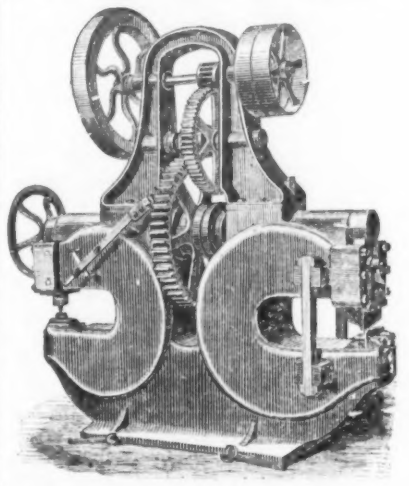


"BLAISDELL" UPRIGHT DRILLS

And other First-Class Machinists' Tools.

COMBINED

PUNCH & SHEARS.



Lambertville Iron Works,

A. WELCH,

LAMBERTVILLE, N. J.

Holt's Forges.

FIVE SIZES.

FOR ALL KINDS OF WORK.

$10 and Upward

Send for circulars.

HOLT MFG. CO.,

Cleveland, Ohio.

THE "EDDY" STRAIGHTWAY

VALVES.

ALSO

FIRE HYDRANTS.

Axe, Hatchet, Powder and Brush Machinery.

THE EDDY VALVE COMPANY,

WATERFORD, N. Y.

AGENTS IN ALL PRINCIPAL CITIES.

Send for Price List.

THE LA FRANCE FIRE ENGINE CO.

MANUFACTURERS OF

Rotary Steam Fire Engines

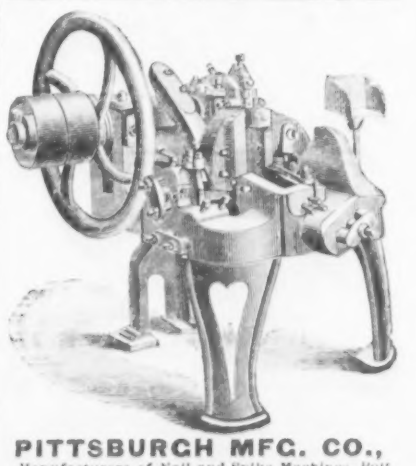
ELMIRA, N. Y.

BAILY PORTABLE HOIST.

Warranted double the power and not one half the price of other hoisters. As a proof of the above, I will give them 30 days on trial. Send for catalogue and price list.

J. DUNN,

32 Bank St., Cleveland, Ohio.



PITTSBURGH MFG. CO.,

Manufacturers of Nail and Spike Machines, Bolt Nuts, Washers, Rivets, &c. Castings, Forgings and Blacksmith Work promptly attended to.

Office and Works, Railroad St., near 28th, Pittsburgh, Pa.

Passenger & Freight,
Steam, Hydraulic,
and Belt Power

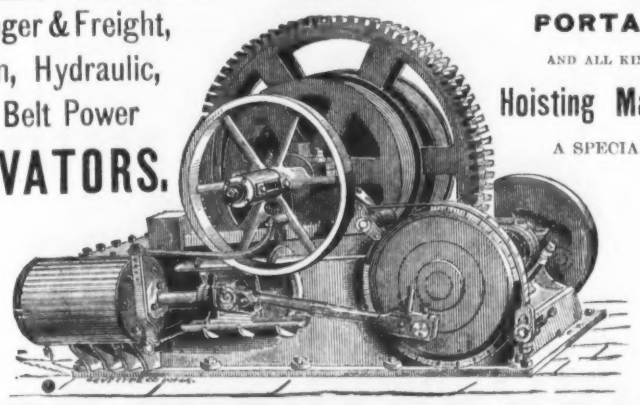
ELEVATORS.

PORTABLE

AND ALL KINDS OF

Hoisting Machinery

A SPECIALTY.



IRON FURNACE HOIST,

For Handling Stock to Top of Stack with One or Two Platforms.

STOKES & PARRISH, 3001 Chestnut St., Philadelohia.

$ $ $ $ **SAVED** $ $ $ $

1977 NINETEEN HUNDRED SEVENTY-SEVEN **1977**

MACHINES

BOTH NEW AND SECOND-HAND

COMPRISING
MACHINE AND BLACKSMITH
TOOLS OF EVERY DESCRIPTION.
WOOD-WORKING MACHINERY IN ALL ITS
BRANCHES. PORTABLE ENGINES. UPRIGHT and HORIZONTAL STATIONARY ENGINES, 1 TO 100 HORSE POWER. HORIZONTAL, LOCOMOTIVE FIRE-BOX, and UPRIGHT BOILERS, 1 TO 100 HORSE POWER. WATER WHEELS, COTTON AND WOOLEN MACHINERY, STEAM PUMPS, GRISTMILL MACHINERY,
Etc., FULLY DESCRIBED, AND
PRICES ANNEXED,

S.C.F.&CO.

☞ Send stamp for same,] In our List No. 23. [stating what you want. ☜

We have the Largest Assortment of Machinery to be found in the hands of any firm in the country.

Works and Main Office, Manchester, N. H.

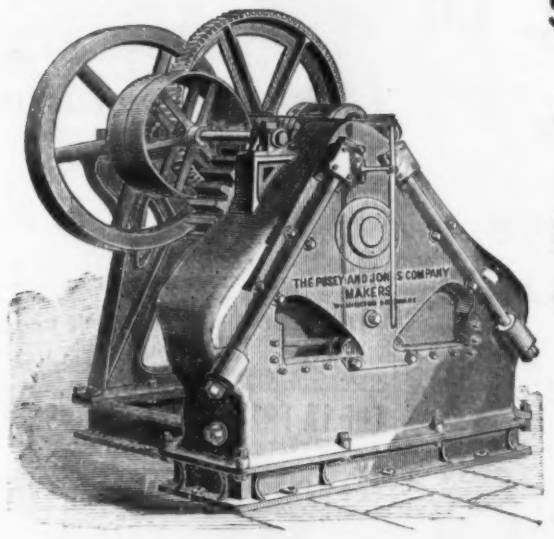
S. C. FORSAITH & CO.

Branch Office and Wareroom, 209 Centre street, New York City.

THE PUSEY & JONES COMPANY,

WILMINGTON, DELAWARE,

BUILDERS OF



STEAM ENGINES,

Boilers, Tanks,

MACHINERY FOR ROLLING MILLS,

Punches, Shears,

Machines for Cutting off and Slitting old Railroad Rails previous to being piled in Rolling Mills,

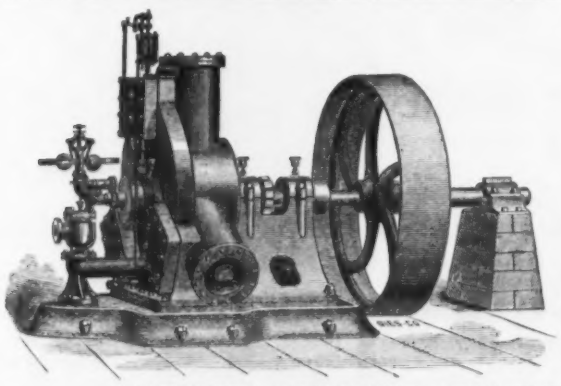
Steam Riveting Machines,

Applicable to Bridge Builders' Work.

RIGHT AND LEFT ANGLE IRON CUTTERS,

Hydraulic Bending Machines,

AND HEAVY MACHINERY GENERALLY.



GARDNER'S PATENT Three Cylinder ENGINE.

The Most Simple and DURABLE Steam Engine in Use Adapted for any duty. Send for Illustrated CATALOGUE Giving full Description.

EVERY ENGINE WARRANTED.

OVE 000 H. PR. IN USE. Correspondence invited. Special Engine for HIGH SPEEDS, prices of which will be quoted upon application. MANUFACTURED

EXCLUSIVELY

BY R. DUNBAR & SON, Buffalo, New York, U. S. A.

DROP FORGINGS

Of Every Description a Specialty.

ADDRESS,

R. H. BROWN & CO.,

WESTVILLE, CONN.

Also Manufacturers of

W. A. CLARK'S PATENT EXPANSIVE BIT,

CLARK'S PATENT HANDLE SCREW DRIVER,

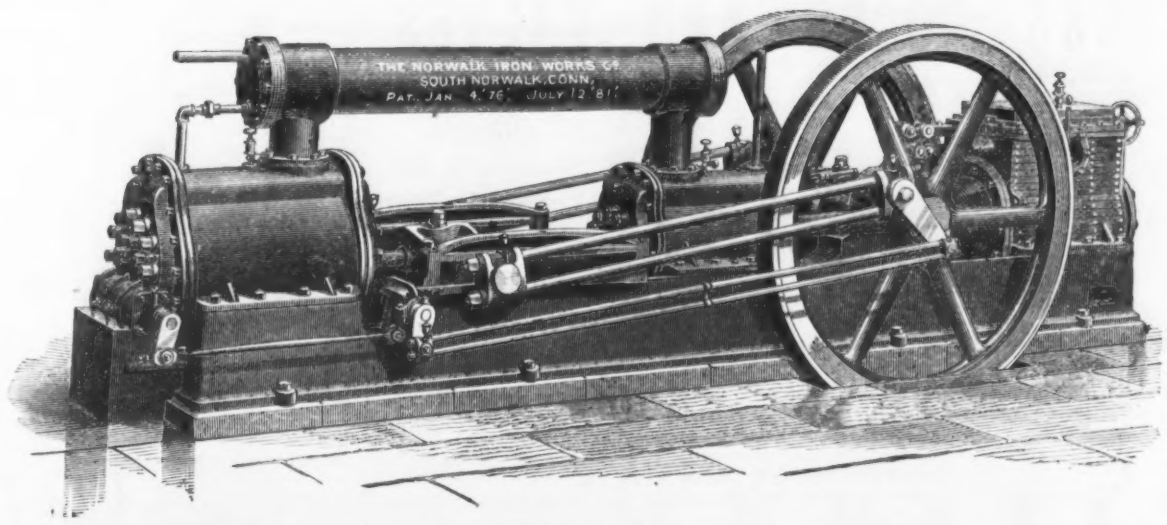
And Other Specialties in Hardware Line.

J. H. WEBSTER, LAWYER.

111 Bank St. CLEVELAND, OHIO.

Prompt personal attention to collections, with immediate remittance. Refer to Wm. Bingham & Co.

Air Compressors.



THE NORWALK IRON WORKS CO., South Norwalk, Conn.

E. W. BLISS

PRESSES & DIES.

SHAPERS & SQUARING SHEARS.

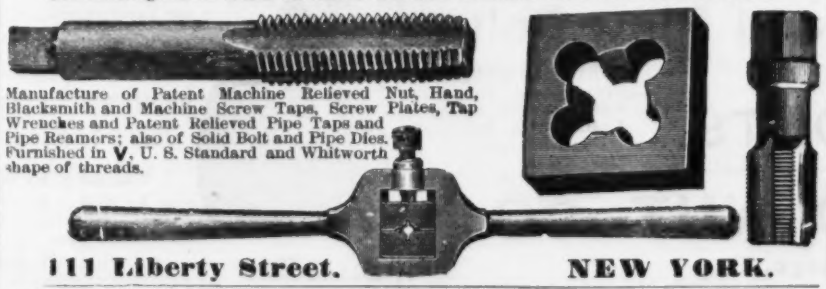
FINE ENGINE LATHES.

SPECIAL MACHINERY FOR TIN & SHEET METAL WORKERS

PLYMOUTH, PEARL & JOHN ST'S. } BROOKLYN, N.Y.

MANNING, MAXWELL & MOORE,

Sole Sales Agents for **THE MORSE TWIST DRILL AND MACHINE CO.'S**



Manufacture of Patent Machine Relieved Nut, Hand, Blacksmith and Machine Screw Taps, Screw Plates, Tap Wrenches and Patent Relieved Pipe Taps and Pipe Reamers; also of Solid Bolt and Pipe Dies. Furnished in U. S. Standard and Whitworth shape of threads.

111 Liberty Street. NEW YORK.

THE HANCOCK INSPIRATOR.

The best **Feeder** known for **Stationary, Marine** and **Locomotive Boilers.**

REQUIRES NO OILING.

Consumes Less Steam Than Any Other Boiler Feeder.

SIMPLE, RELIABLE AND ALWAYS IN ORDER.

FAIRBANKS & CO.

311 Broadway, NEW YORK.

THOS. H. DALLETT & CO.,

SUCCESSORS TO

THORNE, DeHAVEN & CO., Drilling Machines,

21st Street, above Market, Philadelphia.

PORTABLE DRILLS, Driven by power in any direction. **RADIAL DRILLS,** Self-feed—Large Adjustable Box Table. **VERTICAL DRILLS,** Self-feeding. **MULTIPLE DRILLS,** 2 to 20 Spindles. **HORIZONTAL BORING AND DRILLING MACHINES. HAND DRILLS. CAR BOX DRILLS. SPECIAL DRILLS,** For Special Work.

Standard Weight Lap Welded

WROUGHT IRON PIPE, &c.,

STEAM PUMPS, &c.,

STEAM AND HYDRAULIC

Freight & Passenger Elevators, &c.

STEAM HOISTING ENGINES, &c

MANUFACTURED BY

CRANE BROS. MFG. CO.

CHICAGO.

Send for Catalogue.

HAND BONE MILL.

Grinds bones GREEN or DRY. (Frank Wilson's Pat.) Prices from $5 to $15. For the Poultryman, Gardener and Farmer. Send for illustrated circulars and testimonials to

WILSON BROS., Sole Mfrs.,

Easton, Pa., U. S. A.

Special cash discount to the trade.

MARTIN REYNOLDS,

354 Lorimer St., Brooklyn, E. D.,

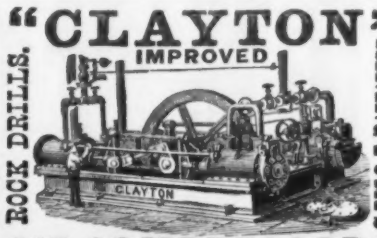
Brass Smelter & Refiner.

Ingot Brass for Car Bearings a specialty.

Brass washings for bell makers always on hand.

"CLAYTON" MINING PUMPS

ROCK DRILLS. IMPROVED



AIR COMPRESSORS

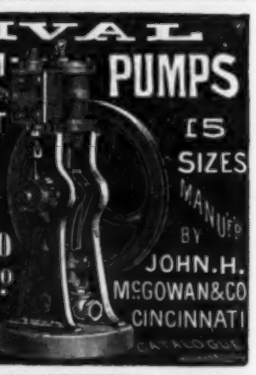
For CATALOGUES, ESTIMATES, Etc. Address,

CLAYTON STEAM PUMP WORKS

45 & 47 York St., **BROOKLYN, N.Y.**

(Near Approach to New York & Brooklyn Bridge.)

RIVAL STEAM PUMPS



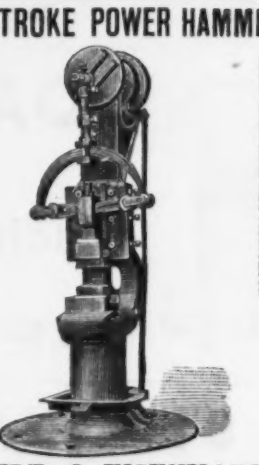
THE CHEAPEST AND THE BEST FOR HOT & COLD WATER.

$35.00 UPWARDS.

15 SIZES MANUF'D BY JOHN.H. McGOWAN & CO CINCINNATI

SEND FOR CATALOGUE

DEAD-STROKE POWER HAMMERS.



CONSTRUCTION IMPROVED. Seven Sizes. Prices Reduced. 5 to 250 Pounds.

These and 25 pound sizes are specially adapted for Pianomakers' use, the other sizes for general forging. Send for circular and references.

DIENELT & EISENHARDT,

MAKERS,

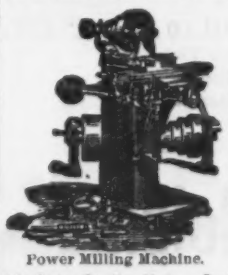
1310 Howard St., Philadelphia.

E. E. GARVIN & CO.,

Machinists and Manufacturers of

MILLING MACHINES, DRILL PRESSES, HAND LATHES, TAPPING MACHINES,

CUTTER GRINDERS & WOOD PLANERS.

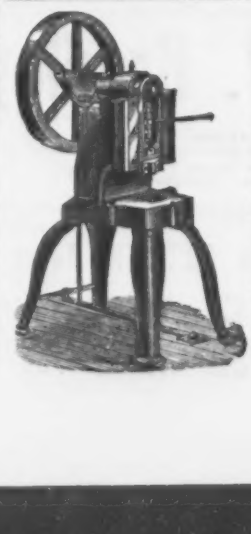


Milling Cutters, all Shapes and Sizes. Gear Cutting and Milling in all its Branches. Index Plates Drilled Accurately. Special Tools and Machinery Designed and Built to Order.

Power Milling Machine.

141 Centre St., New York. Send for Illustrated Catalogue.

THE BEST NUT TAPP'G MACHINES. RAPID BOLT CUTTERS & POINTERS. BOLT IRON CUTTERS SEND FOR PRICES. THE PURDY MACHINE Co CLEVELAND O.



A. H. MERRIMAN,

Meriden, Conn.,

Manufacturer of all Descriptions of

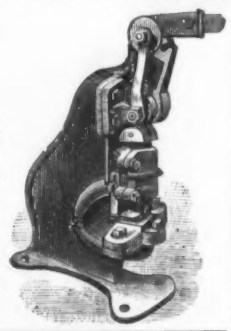
PRESSES.

Catalogue and prices sent on application.

Machinery, &c.

LYON'S HAND OR POWER PUNCHES AND SHEARS.

For Round, Flat or Square Iron,
ALSO,
Polishing & Buffing Machinery,
HYDRAULIC JACKS,
To raise from 2 to 120 tons.
Hydraulic Presses for Special & General Use.
HYDRAULIC HAND & POWER PUMPS
with 1 to 6 plungers, to run hydraulic presses, with either uniform or changeable speed.
Second-hand Presses.
WATSON & STILLMAN,
(Successors to E. LYON & CO.)
470 B Grand Street, NEW YORK.
Send for circular of what you want.



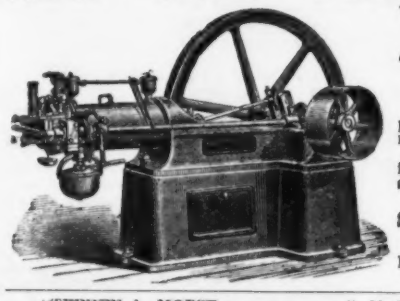
THE MACKENZIE PATENT CUPOLA & BLOWER.

Send for circular to
Smith & Savre Mfg. Co.,
PROPRIETORS, 245 Broadway, New York.

This Cupola has made a great revolution in melting Iron. It differs from all others in having a CONTINUOUS TUYERE, or in other words, the blast enters the fuel at all points. Above one ton capacity per hour, they are made *oval in form*. This brings the blast to the center of the furnace with the *least resistance* and *smallest* possible amount of power, and in combination with the continuous Tuyere causes complete diffusion of the air throughout the furnace, and uniform temperature, melting *ten* or *fifteen tons* an hour with the pressure of blast required to melt *two* or *three tons* in an ordinary Cupola. It also enables us to save very largely in *time* and *fuel*, the experience of our customers showing a gain of *twenty-five* to *fifty* per cent. in *time*, and *twenty-five* to *forty* per cent. *fuel* over the ordinary Cupola, and a BETTER QUALITY OF CASTING, especially in light work. This is due to the thorough diffusion of the air and more perfect combustion, extracting less carbon from the iron, making a softer and tougher casting.

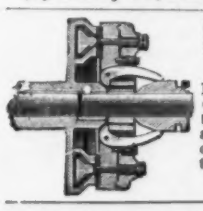
We manufacture these Cupolas of any desired capacity, numbered from 1 to 20, inclusive, the numbers indicating the melting capacities in TONS PER HOUR—No. 1, one ton, ; No. 2, two tons; No. 3, three tons per hour, and so on up to 15, or 20 tons. We have *improved* the *construction* of these Cupolas in every way, have increased their strength and durability, and sought to make them as convenient for working and repairs as our own and the experience of our customers could suggest.

NEW OTTO SILENT GAS ENGINE.



Working Without Boiler, Steam, Coal, Ashes or Attendance.
Started Instantly by a Match, it gives Full Power Immediately.
When Stopped, all Expense Ceases.
No explosions, no fires nor cinders, no gauges, no pumps, no engineer or other attendant while running. Recommended by insurance companies.
UNSURPASSED IN EVERY RESPECT for hoisting in warehouses, printing, ventilating, running small shops, &c.
1, 2, 4, 7, 10, 15 and 25 Horse-Power. Built by
SCHLEICHER, SCHUMM & CO.,
Engineers and Machinists,
N. E. Cor. 33d & Walnut Sts., Phila'phia.
214 Randolph St., Chicago.

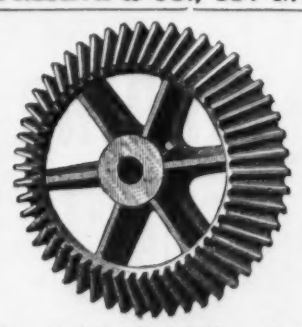
STEPHEN A. MORSE. C. M. WILLIAMS. EDWIN F. MORSE.
SEND FOR CIRCULARS. **CLEM & MORSE,** LATEST PATENTED IMPROVEMENTS.
Manufacturers and Builders of
ELEVATORS,
Hoisting Machinery, Automatic Hatch Doors, &c.
413 Cherry St., PHILADELPHIA, PA. Branch Office, 108 Liberty St., NEW YORK.



HOISTING ENGINES

We are now prepared to deliver 6x12 and 7x12 single cylindered Horizontal Engines, and double cylindered at short notice, with the ***Frisbie Friction Clutch*** attached, with or without boilers. This clutch has proved to be the best in the world for this work. It can be so adjusted that it will do a small amount of work, and from that up to the full power of engine, with no risk of breaking ropes, gearing or engine, a feature which no other friction contains. Address,
D FRISBIE & CO., 481 N. Fifth St., Phila., Pa.

MACHINE MOLDED GEARING



From 1 to 20 feet Diameter.

SHAFTING, PULLEYS AND HANGERS
A Specialty.

POOLE & HUNT, BALTIMORE, MD.

TRADE MARK
WICKERSHAM & CO.,
MANUFACTURERS OF
RAILWAY, MINERS', MILL & MACHINISTS' SUPPLIES.
W. & Co.'s Packing: Steam, Hydraulic and Locomotive. Samples sent free.
Lubricants for Engines, Shafting, &c.; Rolling Mill, Railroad, Gear and Axle Grease.
Also, Star Cylinder Oils,
No. 309 Race Street, Philadelphia, Pa.
No. 232 LAKE STREET, Chicago, Ill.

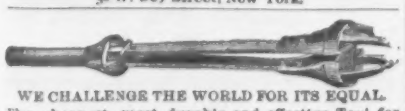
DRILL PRESSES.

New Upright Power Drill Presses. No. 3 swings 21 inches; back-geared, quick return. A strong iron brace extends from base to head of column—a new feature. Weight, 1100 lbs.; hight, 6 feet. Price, $210.

No. 1½, on legs, swings 15¾ inches, 4 speeds. Price, $75.

No. 1 size, to set on bench, swings 13 inches, lever feed, 3 speeds, tight and loose pulleys. Price, $35.

Peerless Punch & Shear Co.,
38 W. Dey Street, New York.



WE CHALLENGE THE WORLD FOR ITS EQUAL.
The cheapest, most durable and effective Tool for Cleaning Tubes Hot or Cold.
RUFFNER & DUNN, Schuylkill Falls, Philadelphia, Pa
Patentees and Sole Manufacturers of the EXCELSIOR STEEL TUBE CLEANERS. Most liberal discount to dealers. Send for Circulars

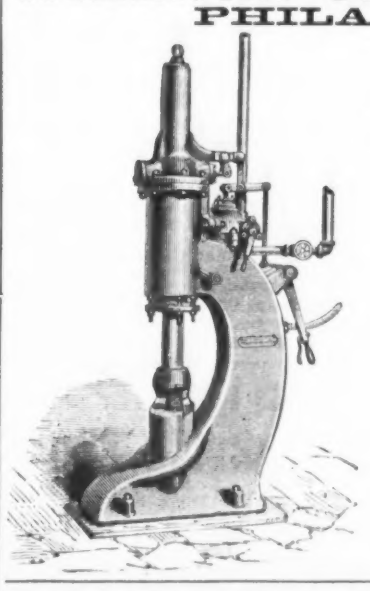
PUNCHING & SHEARING PRESSES.

Power, Foot or Hand
PUNCHES,
AND
SHEARS.
All sizes, from $25 to $3000
Peerless Punch & Shear Co.,
38 W. Dey Street,
NEW YORK CITY.

WM. McFARLAND
Iron and Brass Founder.
TRENTON, N. J.
Chilled Cast Wire Dies a Specialty
Any size or style made at short notice.

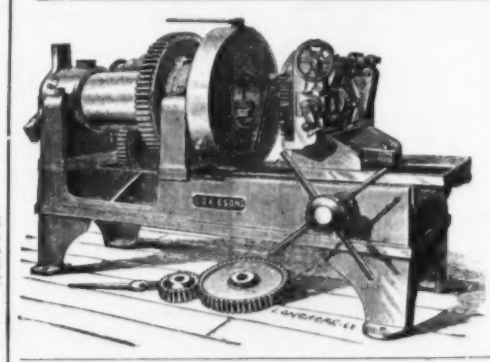
Machinery, &c.

WILLIAM SELLERS & CO.,
PHILADELPHIA.

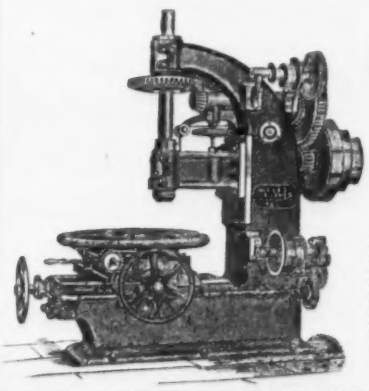


MANUFACTURERS OF
Iron and Steel Working Machinery.
MACHINISTS' TOOLS,
SHAFTING,
GEARING, &c.,
INJECTORS.
BRANCH OFFICE:
79 LIBERTY STREET, NEW YORK.

SOUTHWARK FOUNDRY & MACHINE CO.,
430 Washington Ave., PHILA., PA.,
ENGINEERS AND MACHINISTS.
BLOWING ENGINES AND HYDRAULIC MACHINERY.
SOLE MAKERS OF THE
PORTER-ALLEN AUTOMATIC CUT-OFF STEAM ENGINE.

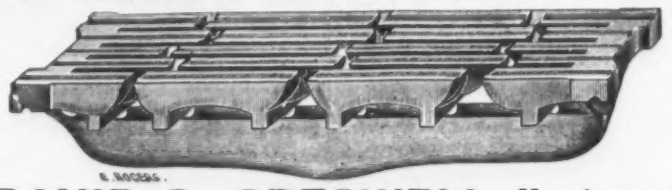


Machines for Threading and Cutting off Pipe from one-eighth inch to twelve inches diameter. Hand Screwing Machines one-eighth inch to two inches.
COX & SONS,
204 N. 4th St.,
PHILADELPHIA, PA.



VERTICAL
MILLING MACHINES,
MADE BY
HILLES & JONES,
WILMINGTON, DEL.
By actual demonstration it has been proven that our HEAVY VERTICAL MILLING MACHINES will do a large amount of work that is now done on slotting machines, with a saving of 50 per cent. of files and finisher's time. To work out Links, Connecting-Rod Straps, Guide Yokes, Cross-Heads, Connections, &c., make the milling tool the proper diameter for the fillets; you then obtain the right radius and uniformity of size and style.
THREE SIZES.

W. C. WREN'S PATENT GRATE BAR.



DAVID S. CRESWELL, Manufacturer,
916 Race Street, - - - PHILADELPHIA, PA.
The most durable Grate Bar on the market. Send for circular and price list.

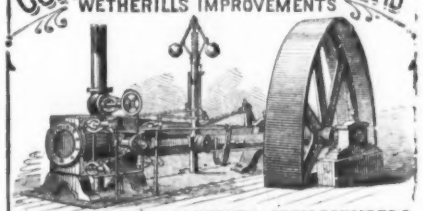
HARRISON BOILER.

BOILER MADE OF SPHERES MUST UNITE GREATEST

STRENGTH WITH MOST HEATING SURFACE.
Send for
CIRCULAR.

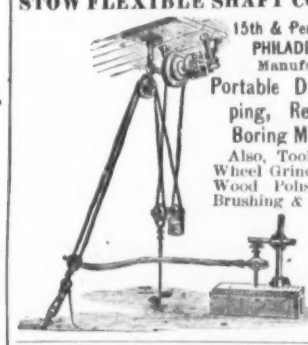
Machinery, &c.

CORLISS ENGINE BUILDERS
WITH WETHERILLS IMPROVEMENTS



ENGINEERS, MACHINISTS, IRON FOUNDERS AND BOILER MAKERS.
ROBT. WETHERILL & CO. Chester, Pa.

STOW FLEXIBLE SHAFT CO., Limited

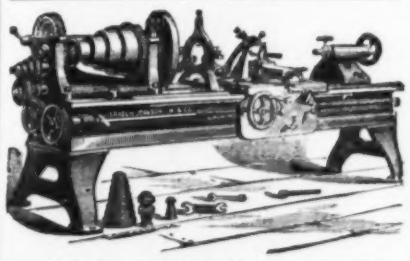


15th & Pennsylvania Ave.
PHILADELPHIA, PA.,
Manufacturers of
Portable Drilling, Tapping, Reaming and Boring Machines.
Also, Tools for Emery Wheel Grinding, Metal & Wood Polishing, Cattle Brushing & Clipping, &c.
General European Agents BOLLING & LOWE, 2 Lawrence Pountney Hill, London, England.

CHARLES W. ERVIEN & CO.,
Engine Builders, Boiler Makers and
GENERAL MACHINISTS,
IRELAND STREET, PHILADELPHIA.

PHILA. SHAFTING WORKS

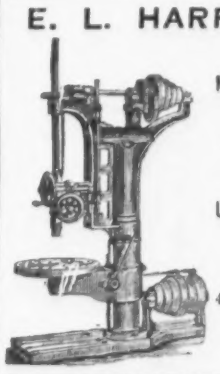
GEO. V. CRESSON,
18th & Hamilton Sts
PHILADELPHIA.
SHAFTING A SPECIALTY.
Manufacturers of
Shafting, Pulleys, Hangers, Couplings, and every appurtenance used in the TRANSMISSION OF STEAM POWER.



ISRAEL H. JOHNSON, Jr., & CO.,
Tool and Machine Works,
Manufacturers of
ENGINE, BRASS FINISHERS', WOOD TURNERS AMATEURS' and JEWELERS' LATHES.
Slide Rest, Screw Machines, Turret Heads, Screw Presses, Screw Clamps, Lathe Carriers, &c.
1422, 1424 & 1426 Callowhill Street, Philadelphia, Pa.
Israel H. Johnson, Jr. Joshua R. Johnson, Jr.

Established 1867.
Edwin Harrington & Son
MANUFACTURERS OF
PATENT EXTENSION AND SCREW CUTTING
LATHES
Iron Planers,
Radial, Upright, Suspension Multiple and Lever
DRILLS,
and a variety of other MACHINISTS' TOOLS
Patent
Double Chain Screw Pulley Blocks,
Unrivalled for *Durability, Safety* and *Power*.
Patent Double Chain Quick-Lift Hoists,
with Brake for quick and lowering.
Circulars furnished.
WORKS AND OFFICE,
Cor. N. 15th and Penna. Ave., Philadelphia, Pa., U. S. A.
Represented by J. Q. MAYNARD, 12 Cortlandt St., N. Y., C. E. KIMBALL, 191 High St., Boston, W. H. RICKEY, 126 Main St., Cincinnati.

E. L. HARRINGTON,
Manufacturers of
MACHINISTS' TOOLS
AND
Special Machinery.
UPRIGHT DRILLS A SPECIALTY.



426 N. 23d Street
(Cor. of Linn),
Philadelphia.

G. E. BRETTELL,
Furnace St.,
Rochester, N. Y.
Planers a Specialty.
26x26, 30x26 and 30x30 in. to plane 7 and 10 ft. long.
SEND FOR PRICE LIST.

G. Brett. ll, Rochester, N Y

TUBAL SMELTING WORKS,

760 & 762 Broad Street, PHILADELPHIA.

PAUL S. REEVES,

MANUFACTURER OF

GENUINE BABBITT METAL

AND ALL GRADES OF

ANTI-FRICTION METALS.

ESTABLISHED 1842.

WM. & HARVEY ROWLAND,

PHILADELPHIA,

P. O. Address: Frankford, Phila'a. } MANUFACTURERS OF ALL KINDS OF

Elliptic, Platform AND C Springs,

"Brewster Side-Bar Combination Patented" Springs and Timken's Patent Cross Springs,

Reiff's Patent, Groot's Patent, Carter's Patent and Saladee's Patent Crescent Spring,

MADE EXCLUSIVELY FROM

SWEDISH STOCK, OIL-TEMPERED and WARRANTED.

Swedish Tire, Toe, Blister and Spring Steel.

CAST SPRING AND PLOW STEEL.
CAST SHOVEL, HOE AND MACHINERY STEEL.

OXFORD TOE, SLEIGH, TIRE AND SPRING STEEL.
BESSEMER SHOVEL AND PLOW STEEL.
BESSEMER MACHINERY AND CULTIVATOR STEEL.

RE-ROLLED NORWAY SHAPES.

NORWAY NAIL RODS ROLLED AND SLIT FROM SUPERIOR BRANDS.

STEEL CASTINGS

FROM 1-4 TO 15,000 LBS. WEIGHT,

True to pattern, sound and solid, of unequaled strength, toughness and durability. An invaluable substitute for forgings, or for cast iron requiring three-fold strength. Gearing of all kinds, Shoes, Dies, Hammerheads, Crossheads for Locomotives, etc. 20,000 Crank Shafts and 15,000 Gear wheels of this Steel now running prove its superiority over other Steel Castings. CRANK SHAFTS, CROSSHEADS AND GEARING ARE SPECIALTIES. Castings of every description. Circulars and Price Lists free. Address

CHESTER STEEL CASTINGS CO.,

Works, Chester, Pa. *407 Library st., Philadelphia.*

PITTSBURGH STEEL CASTING CO.,

26th and Railroad Streets, PITTSBURGH, PA.

MANUFACTURERS OF

Refined Bessemer Steel ; Improved Steel Castings

Under Hainsworth's Patents.

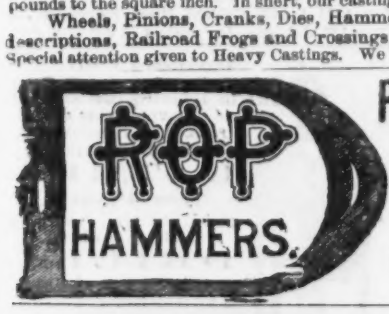
We are now prepared to fill orders for refined **BESSEMER BILLETS or BLOOMS** of any desired carbon and a uniform quality.

We would call attention of consumers to the fact that we use good material, and produce a steel pronounced by competent judges equal to the best English or German spring and soft steels.

Having had twelve years' experience in the making of **STEEL CASTINGS,** we are able to refer to our customers in all part of the United States and Canada as to the quality of our work in this line. We make castings of steel practically free from blow-holes, as soft and easily worked as wrought iron, yet stiff, strong and durable, with a tensile strength of not less than 65,000 pounds to the square inch. In short, our castings unite the qualities of steel and wrought iron.

Wheels, Pinions, Cranks, Dies, Hammer Heads, Engines and Machinery Castings of all descriptions, Railroad Frogs and Crossings, Plowshares, Moldboards and Landsides.

Special attention given to Heavy Castings. We use no cast iron in our castings. Send for circular.



Punching Presses,

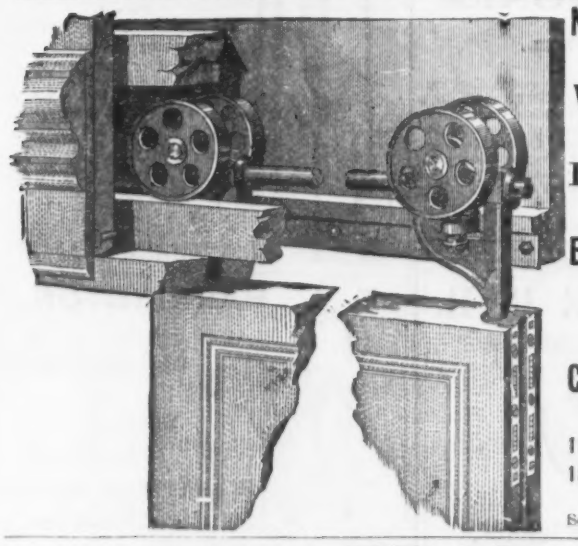
DIES AND OTHER TOOLS

For the manufacture of all kinds of

SHEET METAL GOODS, DROP FORGINGS, &c.

Stiles & Parker Press Co.,

Middletown, Conn.



NO FLANGED WHEELS.

Warner's Patent SLIDING DOOR HANGER,

MANUFACTURED BY

E. C. STEARNS & CO.,

SYRACUSE, N. Y.

SALES OF

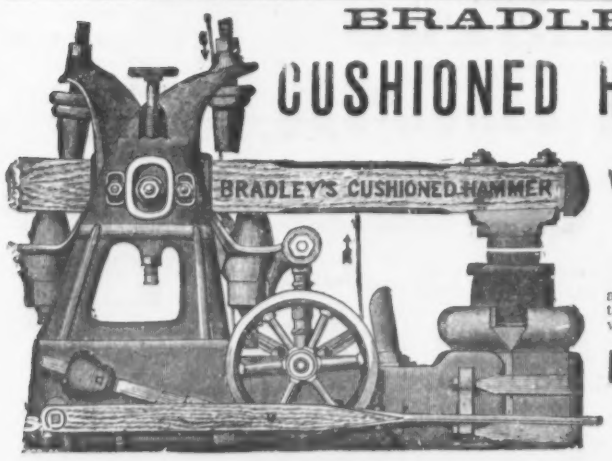
CHAS. HUMES & CO.,

ST. LOUIS MO.

1877, - - - 20 SETS.
1881, - - - - 500 SETS.

Send for Illustrated Catalogue.

BRADLEY'S



CUSHIONED HAMMER

STANDS TO-DAY WITHOUT AN EQUAL.

Over 800 in use.

It approaches nearer the action of the smith's arm than any hammer in the world.

Bradley & Co.

SYRACUSE, N. Y.

(Established 1832.)

STANLEY G. FLAGG & CO.

PHILADELPHIA, PA.

Office and Works,

N. W. cor. 19th St. & Pennsylvania Ave.

Manufacturers of

STEEL CASTINGS.

A Substitute for Steel & Wrought Forgings.

☞ Circulars sent on application. ☜

Steel Castings.

Light and heavy **Steel Castings** of superior metal, solid and homogeneous. All work guaranteed. Send for circular.

EUREKA CAST STEEL CO.,
Chester, Pa.

Office: 307 Walnut St., Phila.

"DIETZ"

TUBULAR OIL STOVE

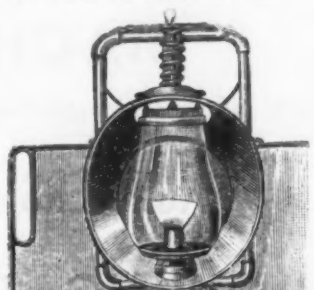
FOR 1883.

"DIETZ" No. 0 TUBULAR

REFLECTOR LANTERN,

WITH DASH ATTACHMENT.

Throws a Powerful Light more than 100 feet.



56 Fulton Street, - - NEW YORK.

25 Lake St., CHICAGO.

TACKLE BLOCKS.

Rope and Iron Strap of all kinds. Lignumvitæ Wood for Ten-Pin Balls.

Wm. H. McMillan & Bro.,

Office, 113 South Street, New York

Factory, 32 to 40 Penn St., Brooklyn, E. D.

COLUMBIA BICYCLE.

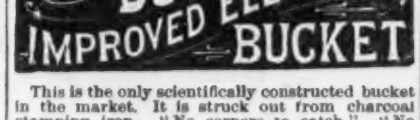
The Bicycle, as a permanent, practical road vehicle, is an acknowledged fact, and the thousands in daily use are constantly increasing in numbers. It combines speed and endurance that no horse can equal, and for pleasure or health is far superior to any other out-door sport. The art of riding is easily acquired, and the exercise is recommended by the medical profession as a means of renewing health and strength, as it brings into action almost every muscle of the body. Send 3c. stamp for 24-page illustrated catalogue, containing price lists and full information.

THE POPE MFG. CO.,

597 Washington st., Boston, Mass.

New York Riding School, 34th Street, near 3rd Avenue.

THE BEST IN USE.



This is the only scientifically constructed bucket in the market. It is struck out from charcoal stamping iron. "No corners to catch." "No seams to burst." "No interior corners to clog up." It runs with great ease and half the power of the old style bucket. Will outwear half a dozen of them. *Prices Reduced.*

T. F. ROWLAND, Sole Mfr.,

BROOKLYN, N. Y.

MICHIGAN BLOCK WORKS.

Detroit, Mich., U. S. A.

Send for Catalogue and Price List.

BUFFALO SCALE CO.,

BUFFALO, N. Y.,

Manufacturers of

R. R. Track Scales, Hay Scales, Coal Scales, Grain Scales, Platform Scales, Counter Scales, &c.

Send for price list, stating what you want.

Scranton Brass Works,

J. M. EVERHART,

Manufacturer of

BRASS WORK,

For Water, Gas & Steam. Also

Carr & Wilcox's Patent Cut Files

Will cut faster, wear longer, and clog less than any File in the market.

Cliff Street, - - SCRANTON, PA.

BLACKSMITH DRILLS.

CLARK SINTZ & CO.

SPRINGFIELD OHIO

RUSSELL, BURDSALL & WARD.

PORTCHESTER, N. Y.,

MANUFACTURERS OF

CARRIAGE, TIRE, PLOW, STOVE & OTHER BOLTS.

Carriage Bolts made from Best Square Iron a Specialty.

JOHN RUSSELL CUTLERY CO.,

Green River Works,

MANUFACTURERS OF

Table and Pocket Cutlery,

BUTCHERS,' HUNTERS', PAINTERS', DRUGGISTS' & HOUSEHOLD KNIVES

IN ALL STYLES AND VARIETIES.

OLDEST AND LARGEST AMERICAN MANUFACTURERS.

Factories, J. RUSSELL & CO. ESTABLISHED 1834. GREEN RIVER WORKS, MASS. Turners Falls, Mass.

F. W. WURSTER,

IRON FOUNDRY AND AXLE WORKS,

130 to 142 First St., Brooklyn, N. Y.

AXLES

SUPERIOR

WAGON, CART AND CARRIAGE AXLES.

Our facilities enable us to quote the trade lower prices than any other manufactory. Send for price list.

MANUFACTURER OF TAPS AND DIES.

"BOYNTON'S" UNRIVALED SOLID STEEL SAW SET.

E. M. BOYNTON SAW & FILE CO.

34, 36, 38, 40 & 42 DEVOE ST.

BROOKLYN.

The only perfect set known; a blind man can use it by simply bringing handles together. A perfect gauge, adjusted by a single thumb-screw, will set both points of a Lightning Buck Saw at once, and will set any saw from an ordinary hand saw to a 12 gauge mill saw.

10 in. Solid Steel, $12 per doz.
No. 2 Size. $10 per doz.
25 % discount.

"BOYNTON'S PATENT LIGHTNING SAW SET AND FILE COMBINED."

5 in., $2.50. 8 in., $5 50.
10 in., $6.50.
Less 40 % discount.

BOYNTON'S "PATENT LOOP"

Cross Cut Saw Handles.

Per Dozen, 15 Cents Each.
Per 100, Barreled, 12½ Cents Each.
Per 1000, Barreled, 10 Cents Each.

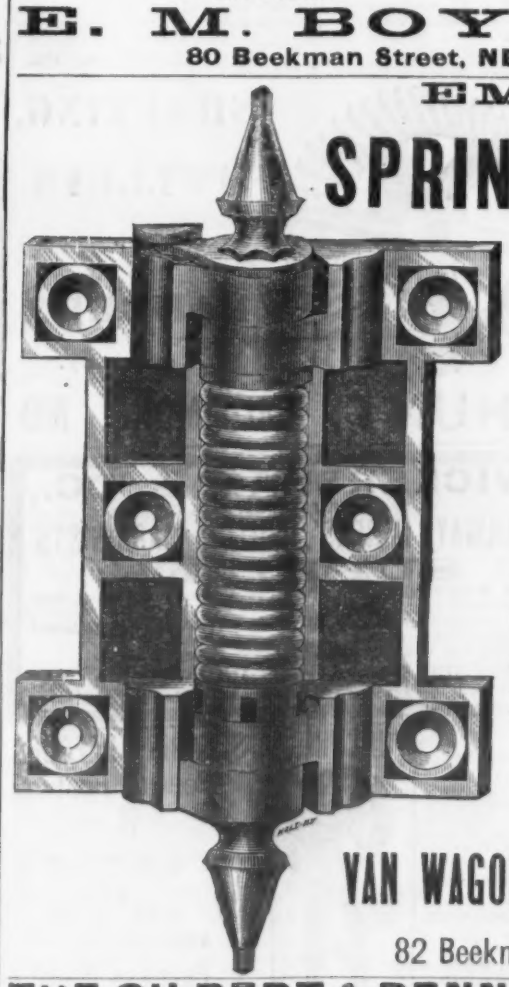
It has no rival: it is the best, the heaviest, the strongest, and outsells all others.

E. M. BOYNTON,

80 Beekman Street, NEW YORK.

EMPIRE

SPRING HINGES.



SINGLE AND DOUBLE ACTING.

Give better satisfaction in **actual use** than any other Screen Door Hinges in the market.

MANUFACTURED BY

VAN WAGONER & WILLIAMS,

82 Beekman St., New York.

THE GILBERT & BENNETT MFG. CO.

Georgetown, Conn.,

Manufacturers of

Iron Wire, Sieves and Wire Cloth,

Power Loom Painted Screen Wire Cloth

GILBERT'S RIVAL ASH SIEVE

Galvanized Twist Wire Netting.

WAREHOUSE:

42 Cliff Street, New York.